

February 7, 2001

Mr. Robert G. Byram
Senior Vice President
and Chief Nuclear Officer
PP&L, Inc.
2 North Ninth Street
Allentown, PA 18101

SUBJECT: RELIEF REQUEST NO. 19 (RR-19) FROM AMERICAN SOCIETY OF
MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE SECTION
XI, SUSQUEHANNA STEAM ELECTRIC STATION UNITS 1 AND 2 (TAC NOS.
MB0367 AND MB0368)

Dear Mr. Byram:

By letter dated October 23, 2000, PPL Susquehanna, LLC, submitted RR-19 to request relief from the requirements of Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) for the second 10-year inservice inspection (ISI) interval. This request for relief proposed using performance demonstration flaw sizing tolerances based on statistical averages in lieu of prescriptive length sizing tolerances and statistical depth sizing criteria specified in the 1995 Edition with 1996 Addenda, Appendix VIII of Section XI of the Code.

The staff has concluded that the proposed alternatives to the ASME Code requirements provide an acceptable level of quality and safety and are acceptable. Pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternatives are authorized for the second 10-year ISI interval. The staff's safety evaluation is enclosed.

Sincerely,

/RA/

Marsha Gamberoni, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosure: Safety Evaluation

cc w/encl: See next page

Mr. Robert G. Byram
Senior Vice President
and Chief Nuclear Officer
PP&L, Inc.
2 North Ninth Street
Allentown, PA 18101

February 7, 2001

SUBJECT: RELIEF REQUEST NO. 19 (RR-19) FROM AMERICAN SOCIETY OF MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE SECTION XI, SUSQUEHANNA STEAM ELECTRIC STATION UNITS 1 AND 2 (TAC NOS. MB0367 AND MB0368)

Dear Mr. Byram:

By letter dated October 23, 2000, PPL Susquehanna, LLC, submitted RR-19 to request relief from the requirements of Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) for the second 10-year inservice inspection (ISI) interval. This request for relief proposed using performance demonstration flaw sizing tolerances based on statistical averages in lieu of prescriptive length sizing tolerances and statistical depth sizing criteria specified in the 1995 Edition with 1996 Addenda, Appendix VIII of Section XI of the Code.

The staff has concluded that the proposed alternatives to the ASME Code requirements provide an acceptable level of quality and safety and are acceptable. Pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternatives are authorized for the second 10-year ISI interval. The staff's safety evaluation is enclosed.

Sincerely,

/RA/

Marsha Gamberoni, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosure: Safety Evaluation

cc w/encl: See next page

DISTRIBUTION

PUBLIC	MO'Brien	ESullivan	GHill(4)
PDI-1 Reading	RSchaaf	DNaujock	
EAdensam	OGC	ACRS	
MGamberoni	JShea	CCowgill, RGN-I	

Accession No. ML010380252

* No major changes to SE.

OFFICE	PDI-1/PM	PDI-2/LA	DE/EMCB*		OGC	PDI-1/SC
NAME	RSchaaf	MO'Brien	ESullivan		APH for KB	MGamberoni
DATE	1/17/01	1/17/01	12/21/00		2/5/01	2/5/01

OFFICIAL RECORD COPY

Susquehanna Steam Electric Station,
Units 1 &2

Bryan A. Snapp, Esq.
Assoc. General Counsel
PPL Services Corporation
2 North Ninth Street, GENTW3
Allentown, PA 18101-1179

Rocky R. Sgarro
Supervisor - Nuclear Licensing
PPL Susquehanna, LLC
2 North Ninth Street, GENA61
Allentown, PA 18101-1179

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 35, NUCSA4
Berwick, PA 18603-0035

Director-Bureau of Radiation
Protection
Pennsylvania Department of
Environmental Resources
P.O. Box 8469
Harrisburg, PA 17105-8469

Richard W. Osborne
Allegheny Electric Cooperative, Inc.
212 Locust Street
P.O. Box 1266
Harrisburg, PA 17108-1266

PPL Susquehanna, LLC
Nuclear Records (w/enclosure)
Attn: G. DallaPalu
2 North Ninth Street, GENA62
Allentown, PA 18101-1179

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Bryce L. Shriver
Vice President-Nuclear Site Operations
Susquehanna Steam Electric Station
PPL Susquehanna, LLC
Box 467, NUCSA4
Berwick, PA 18603-0035

Herbert D. Woodeshick
Special Office of the President
PPL Susquehanna, LLC
Rural Route 1, Box 1797
Berwick, PA 18603-0035

George T. Jones
Vice President-Nuclear Engineering & Support
PPL Susquehanna, LLC
2 North Ninth Street, GENA61
Allentown, PA 18101-1179

Dr. Judith Johnsrud
National Energy Committee
Sierra Club
433 Orlando Avenue
State College, PA 16803

Board of Supervisors
Salem Township
P.O. Box 405
Berwick, PA 18603-0035

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SECOND 10-YEAR INSERVICE INSPECTION PROGRAM

REQUEST FOR RELIEF NO. 19 (RR-19)

PPL SUSQUEHANNA, LLC

SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-387 AND 50-388

1.0 INTRODUCTION

The inservice inspection (ISI) of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Class 1, 2, and 3 components are to be performed in accordance with Section XI of the ASME Code and applicable edition and addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 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) of 10 CFR 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 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(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 Susquehanna Steam Electric Station, Units 1 and 2, second 10-year interval is the 1989 Edition of the ASME Code. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

By letter dated October 23, 2000, PPL Susquehanna, LLC, the licensee, requested relief from certain ultrasonic testing (UT) requirements pertaining to UT performance qualification for the second 10-year ISI interval at Susquehanna Steam Electric Station, Units 1 and 2. RR-19

proposed using performance demonstration flaw sizing tolerances based on statistical averages in lieu of prescriptive length sizing tolerances and statistical depth sizing criteria specified in the 1995 Edition with 1996 Addenda, Appendix VIII of Section XI of the Code.

2.0 RR-19, APPENDIX VIII, SUPPLEMENT 4, SIZING TOLERANCE CHANGES

The licensee seeks relief from the sizing tolerance of Appendix VIII, Supplement 4, Subparagraph 3.2(b), and the statistical parameters of Subparagraph 3.2(c). This relief request affects all components subject to the UT examination requirements of Supplement 4 of Appendix VIII to the 1995 Edition with 1996 Addenda of Section XI of the Code. References to Supplement 4 by Supplement 6 are not affected.

2.1 Code Requirements for which Relief is Requested

Section 50.55a(g)(6)(ii)(C) of 10 CFR imposes implementation of Appendix VIII to the 1995 Edition with 1996 Addenda of Section XI of the Code. The imposed implementation schedule for Supplement 4 to Appendix VIII was 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).

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 inch; and (3) correlation coefficient is not less than 0.70.

2.2 Licensee's Proposed Alternative to Code

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposed using a length sizing qualification criterion of 0.75 inch RMS in lieu of Appendix VIII, Supplement 4, Subparagraph 3.2(b), and to use the RMS value of 10 CFR 50.55a(b)(2)(xv)(C)(1) which modifies the depth sizing criterion of Appendix VIII, Supplement 4, Subparagraph 3.2(a), in lieu of Subparagraph 3.2(c). The request is for the second 10-year inspection interval.

2.3 Evaluation

The U.S. nuclear utilities created the Performance Demonstration Initiative (PDI) to implement performance demonstration requirements contained in Appendix VIII of Section XI of the Code. To this end, PDI has developed a performance demonstration program for qualifying UT equipment, procedures, and personnel. During the development of the performance demonstration for Supplement 4, PDI determined that the Code criteria for flaw sizing was unworkable. The length sizing tolerance of $-\frac{1}{4}$ inch $+1$ inch in Supplement 4, Subparagraph 3.2(b) encouraged examiners to bias their results on the plus side. To discourage testmanship (passing the test based on manipulation of results rather than skill), PDI adopted a length sizing tolerance of 0.75 inch RMS which has been in use since 1994. As early as 1995, the staff has recognized and accepted PDI's use of 0.75 inch RMS for depth sizing. PDI formalized

their use of 0.75 inch RMS as the criterion for Supplement 4, Subparagraph 3.2(b) in Code Case N-622, "Ultrasonic Examination of RPV and Piping and Bolts and Stubs, Section XI, Division 1." The NRC representatives to ASME Code meetings participated in the process leading up to the publishing of Code Case N-622.

The NRC staff intended to formalize the acceptability of the 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 NRC staff considers that the proposed alternative to use a length sizing tolerance of 0.75 inch RMS in lieu of the requirements in Supplement 4, Subparagraph 3.2(b), will provide an acceptable level of quality and safety.

In the second part of the alternative, 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 percent through-wall. The differences between actual versus true value produce a tight grouping of results which resemble a shotgun 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) a poor and 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 proposed 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, 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).

PDI was aware of the inappropriateness of Subparagraph 3.2(c) early in the development of its program. It 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 values 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.

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.

3.0 CONCLUSION

Based on the discussion above, the NRC staff concludes that the proposed alternatives of RR-19 provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternatives are authorized for the second 10-year ISI interval.

Principal Contributor: D. Naujock

Date: February 7, 2001