CP&L
A Progress Energy Company

10 CFR 50.55a(a)(3)(i)

JUL 16 2002

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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
REQUEST FOR APPROVAL OF RELIEF REQUEST FOR THE THIRD 10-YEAR INSERVICE INSPECTION PROGRAM – INSPECTION OF PIPING WELD OVERLAYS

Ladies and Gentlemen:

In accordance with 10 CFR 50.55a(a)(3)(i), Carolina Power & Light (CP&L) Company is requesting relief from certain requirements of the American Society of Mechanical Engineers (ASME) Section XI, Appendix VIII, Supplement 11 for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. The specific requirements for which relief is requested relate to the qualification requirements for inspecting piping weld overlays using ultrasonic testing (UT). The technical justification for the relief request is provided in Enclosure 1.

The Inservice Inspection (ISI) Program for BSEP, Units 1 and 2, was developed to comply with the 1989 Edition of the ASME Code, Section XI, and has been supplemented as required to incorporate the requirements of the ASME Code, Section XI, Appendix VIII. As prescribed by 10 CFR 50.55a(g)(4)(i), these ISI requirements are subject to the limitations of 10 CFR 50.55a(b). The requirements of the ASME Code, Section XI, Appendix VIII, regarding the qualifications of personnel performing UT, are mandated and supplemented by 10 CFR 50.55a(b)(2)(xiv), (xv) and (xvi). 10 CFR 50.55a(b)(2)(xv) specifies that the requirements of Appendix VIII of the ASME Code, Section XI, 1995 Edition with 1996 Addenda, must be used.

CP&L has been advised by the Electric Power Research Institute (EPRI) staff that, prior to performing UT of Class 1 reactor coolant system (RCS) weld overlays (i.e., for examinations specified by NRC Generic Letter 88-01, "NRC Position on IGSCC in BWR Austenitic Stainless Steel Piping"), relief from the requirements of the ASME Code, Section XI, Appendix VIII, Supplement 11 is necessary. CP&L was also informed that two options exist: (1) adopt ASME Code Case N-653, "Qualification Requirements for Full Structural Overlaid Wrought Austenitic Piping Welds, Section XI, Division 1," with some modifications, or (2) use the EPRI Performance Demonstration Initiative (PDI) Program in lieu of the ASME Code, Section XI, Appendix VIII, Supplement 11

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requirements. EPRI has worked cooperatively with an NRC staff member, Mr. Don Naujock, to develop a sample request for relief, using Option 2 above, to ensure sufficient information is submitted to support NRC review of each licensee's relief request.

In accordance with 10 CFR 50.55a(a)(3)(i), CP&L is requesting relief from the ASME Code, Section XI requirements and proposes to use, as an alternative, the EPRI PDI Program for implementation of ASME Code, Section XI, Appendix VIII, Supplement 11 requirements. The enclosed request for relief for BSEP, Units 1 and 2, has been prepared using the EPRI model relief request guidance previously discussed. The technical content of the BSEP-specific request for relief is equivalent to the EPRI model. Enclosure 2 provides a comparison of the differences between the ASME Code, Section XI, Appendix VIII, Supplement 11; ASME Code Case N-653; and the PDI Program for weld overlay examinations. This additional information is provided to assist in NRC review of the BSEP-specific relief request.

Please refer any questions regarding this submittal to Mr. Leonard R. Beller, Supervisor - Licensing/Regulatory Programs, at (910) 457-2073.

Sincerely,

Edward T. O'Neil
Manager - Regulatory Affairs
Brunswick Steam Electric Plant

WRM/wrm

Enclosures:
1. Relief Request RR-31
2. Comparison of the ASME Code, Section XI, Supplement 11 to ASME Code Case N-653 and the EPRI PDI Program

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ENCLOSURE 1

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
REQUEST FOR APPROVAL OF RELIEF REQUEST FOR THE THIRD 10-YEAR
INSERVICE INSPECTION PROGRAM – INSPECTION OF PIPING WELD OVERLAYS

Relief Request RR-31

System/Component for Which Relief is Requested:

Class 1, Pressure Retaining Welds in Piping, subject to American Society of Mechanical Engineer (ASME) Code, Section XI, Appendix VIII, Supplement 11 examination (i.e., weld overlay examinations).

ASME Code Requirement:

The requirements for which relief is requested are specified in the ASME Code, Section XI, Appendix VIII, Supplement 11. The specific references are provided as follows:

Paragraph 1.1(b) requires –0.1 to+0.25 inch thickness tolerance for specimen overlays.

Paragraph 1.1(d)(1), requires that all base metal flaws be cracks.

Paragraph 1.1(e)(1) requires that at least 20% but less than 40% of the flaws shall be oriented within ± 20° of the pipe axial direction.

Paragraph 1.1(e)(1) also requires that the rules of IWA-3300 shall be used to determine whether closely spaced flaws should be treated as single or multiple flaws.

Paragraph 1.1(e)(2)(a)(1) requires that a base grading unit shall include at least 3 inches of the length of the overlaid weld.

Paragraph 1.1(e)(2)(a)(2) requires the use of cracking in specimen overlay material.

Paragraph 1.1(e)(2)(b)(1) requires that an overlay grading unit shall include the overlay material and the base metal-to-overlay interface of at least 6 square inches. The overlay grading unit shall be rectangular, with minimum dimensions of 2 inches.

Paragraph 1.1(e)(2)(b)(2) requires unflawed areas to be surrounded by unflawed interface material around the perimeter.

Paragraphs 1.1(f)(1), 1.1(f)(3), and 1.1(f)(4) requires the use of actual cracks.

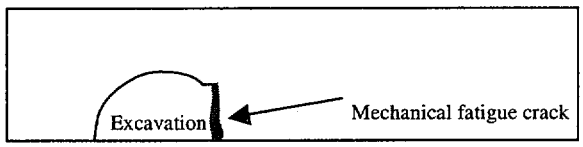
Paragraph 3.2(b) requires that all extensions of base metal cracking into the overlay material by at least 0.1 inch are reported as being intrusions into the overlay material.

Code Requirement for Which Relief is Requested:

In accordance with 10 CFR 50.55a(a)(3)(i), Carolina Power & Light (CP&L) Company is requesting relief from the ASME Code, Section XI requirements and proposes to use, as an alternative, the Electric Power Research Institute (EPRI) Performance Demonstration Initiative (PDI) Program for implementation of ASME Code, Section XI, Appendix VIII, Supplement 11 requirements.

Basis for Relief:

The ASME Code, Section XI, Appendix VIII, Supplement 11, paragraph 1.1(d)(1) requires that base metal flaws be cracks. As illustrated below, implanting a crack requires excavation of the base material on at least one side of the flaw.



While this may be satisfactory for ferritic materials, it does not produce a useable axial flaw in austenitic materials because the sound beam, which normally passes only through base material, must now travel through weld material on at least one side, producing an unrealistic flaw response. To resolve this issue, the EPRI PDI Program revised this paragraph to allow use of alternative flaw mechanisms under controlled conditions. For example, alternative flaws shall be limited to cases where implantation of cracks precludes obtaining an effective ultrasonic response, flaws shall be semi elliptical with a tip width of less than or equal to 0.002 inches, and at least 70 percent of the flaws in the detection and sizing test shall be cracks and the remainder shall be alternative flaws.

Relief is requested to allow closer spacing of flaws provided they do not interfere with detection or discrimination. The existing specimens used, to date, for qualification to the Tri-party (i.e., NRC/Boiling Water Reactor Owners' Group/EPRI) agreement have a flaw population density greater than allowed by the current ASME Code requirements. These samples have been used successfully for the previous qualifications under the Tri-party agreement program. To facilitate their use and provide continuity from the Tri-party agreement program to Supplement 11, the PDI Program has merged the Tri-party test specimens into their weld overlay program. For example:

- The requirement for using the ASME Code, Section XI, IWA-3300 for proximity flaw evaluation in paragraph 1.1(e)(1) was excluded, instead indications will be sized based on their individual merits.

- Paragraph 1.1(d)(1) includes the statement that intentional overlay fabrication flaws shall not interfere with ultrasonic detection or characterization of the base metal flaws.

- Paragraph 1.1(e)(2) was modified to add the requirement that installed flaws shall not interfere with detection/characterization of other flaws.

- Paragraph 1.1(e)(2)(a)(1) was modified to require that a base metal grading unit include at least 1 inch of the length of the overlaid weld, rather than 3 inches.

- Paragraph 1.1(e)(2)(a)(2) was reworded to clarify the extent of overlay grading units.

- Paragraph 1.1(e)(2)(a)(3) was modified to require sufficient unflawed overlaid weld and base metal to exist on all sides of the grading unit to preclude interfering reflections from adjacent flaws, rather than the 1 inch requirement of Supplement 11.

- Paragraph 1.1(e)(2)(b)(l) was modified to define an overlay fabrication grading unit as including the overlay material and the base metal-to-overlay interface for a length of at least 1 inch, rather than the 6 square inch requirement of Supplement 11.

- Paragraph 1.1(e)(2)(b)(2) states that overlay fabrication grading units designed to be unflawed shall be separated by unflawed overlay material and unflawed base metal-to-overlay interface for at least 1 inch at both ends, rather than around its entire perimeter.

- Paragraphs 1.1(e)(2)(b)(3) and 1.1(f)(1) were modified to clarify procedure qualification requirements.

- Words were added to paragraph 2.0 to clarify test administration requirements.

- Paragraph 3.0 was reworded to clarify differences between procedure demonstration versus equipment/personnel qualification.

Additionally, the requirement for axially oriented overlay fabrication flaws in paragraph 1.1(e)(1) was excluded from the PDI Program as an improbable scenario. Weld overlays are typically applied using automated gas tungsten arc welding techniques with the filler metal being applied in a circumferential direction. Because resultant fabrication induced discontinuities would also be expected to have major dimensions oriented in the circumferential direction, axial overlay fabrication flaws are unrealistic.

The requirement in paragraph 3.2(b) for reporting all extensions of cracking into the overlay is omitted from the PDI Program because it is redundant to the Root Mean Square (RMS) calculations performed in paragraph 3.2(c) and it's presence adds confusion and ambiguity to

depth sizing as required by paragraph 3.2(c). This also makes the weld overlay program consistent with the ASME Code, Section XI, Supplement 2, Qualification Requirements for Wrought Austenitic Piping Welds, depth sizing criteria.

The EPRI PDI has submitted these changes, and obtained approval, as ASME Code Case N-653, "Qualification Requirements for Full Structural Overlaid Wrought Austenitic Piping Welds, Section XI, Division 1." ASME Code Case N-653 was approved September 7, 2001. A detailed comparison matrix between Supplement 11, the ASME Code, Section XI Code Case N-653, and the PDI Program is provided in Enclosure 2 as supporting documentation. The first column identifies the current requirements in the 1995 Edition and 1996 Addenda of the ASME Code, Section XI, Supplement 11, while the second (i.e., middle) column identifies the changes made by the Code Case.

There are, however, some additional changes that were inadvertently omitted from the Code Case. The most important change is paragraph 1.1(e)(2)(a)(1), where the phrase "and base metal on both sides," was inadvertently included in the description of a base metal grading unit. The PDI Program intentionally excludes this requirement because some of the qualification samples include flaws on both sides of the weld. To avoid confusion, several instances of the term "cracks" or "cracking" were changed to the term "flaws" because of the use of alternative flaw mechanisms. Additionally, to avoid confusion, the overlay thickness tolerance contained in the last sentence of paragraph 1.1(b), was reworded and the phrase "and the remainder shall be alternative flaws" was added to the next to last sentence in paragraph 1.1(d)(1). These changes are identified by **bold** print in the third column of the enclosure.

Alternate Examination:

In lieu of the requirements of the ASME Code, Section XI, 1995 Edition, 1996 Addenda, Appendix VIII, Supplement 11, the EPRI PDI Program shall be used.

Justification for Granting Relief:

In accordance with 10 CFR 50.55a(a)(3)(i), CP&L requests approval to use the EPRI PDI Program, as described above, in lieu of the ASME Code, Section XI, Appendix VIII, Supplement 11 requirements. Compliance with the PDI Program will provide an adequate level of quality and safety for examination of the affected welds (i.e., weld overlay repairs). EPRI and the NRC have worked closely to reach agreement on the criteria related to the subject examination requirements and both parties have agreed that the PDI Program is an acceptable alternative to the ASME Code, Section XI, Appendix VIII, Supplement 11.

Implementation Schedule:

The relief request is applicable to the third 10-Year ISI interval.

ENCLOSURE 2

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
REQUEST FOR APPROVAL OF RELIEF REQUEST FOR THE THIRD 10-YEAR
INSERVICE INSPECTION PROGRAM – INSPECTION OF PIPING WELD OVERLAYS

Comparison of the ASME Code, Section XI, Supplement 11
to ASME Code Case N-653 and the EPRI PDI Program

Comparison of the ASME Code, Section XI, Supplement 11 to ASME Code Case N-653 and the EPRI PDI Program		
American Society of Mechanical Engineers (ASME) Code, Section XI, Supplement 11	**ASME Code Case N-653**	**Performance Demonstration Initiative Program**
1.0 SPECIMEN REQUIREMENTS		
Qualification test specimens shall meet the requirements listed herein, unless a set of specimens is designed to accommodate specific limitations stated in the scope of the examination procedure (e.g., pipe size, weld joint configuration, access limitations). The same specimens may be used to demonstrate both detection and sizing qualification.	No Change	No Change
1.1 General. The specimen set shall conform to the following requirements.	No Change	No Change
(a) Specimens shall have sufficient volume to minimize spurious reflections that may interfere with the interpretation process.	No Change	No Change
(b) The specimen set shall consist of at least three specimens having different nominal pipe diameters and overlay thicknesses. They shall include the minimum and maximum nominal pipe	No Change	(b) The specimen set shall consist of at least three specimens having different nominal pipe diameters and overlay thicknesses. They shall include the minimum and maximum nominal pipe diameters for which

Comparison of the ASME Code, Section XI, Supplement 11 to ASME Code Case N-653 and the EPRI PDI Program		
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diameters for which the examination procedure is applicable. Pipe diameters within a range of 0.9 to 1.5 times a nominal diameter shall be considered equivalent. If the procedure is applicable to pipe diameters of 24 inch or larger, the specimen set must include at least one specimen 24 inch or larger but need not include the maximum diameter. The specimen set must include at least one specimen with overlay thickness within -0.1 inch to +0.25 inch of the maximum nominal overlay thickness for which the procedure is applicable.		the examination procedure is applicable. Pipe diameters within a range of 0.9 to 1.5 times a nominal diameter shall be considered equivalent. If the procedure is applicable to pipe diameters of 24 inch or larger, the specimen set must include at least one specimen 24 inch or larger but need not include the maximum diameter. **The specimen set shall include specimens with overlay thickness within +0.1 inch of the minimum nominal overlay thickness and within -0.25 inch of the maximum nominal overlay thickness for which the procedure is applicable.**
(c) The surface condition of at least two specimens shall approximate the roughest surface condition for which the examination procedure is applicable.	No Change	No Change
(d) Flaw Conditions		
(1) Base metal flaws. All flaws must be cracks in or near the butt weld heat-affected zone, open to the inside surface,	(1) Base metal flaws. All flaws must be in or near the butt weld heat-affected zone, open to the inside surface, and extending at least	(1) Base metal flaws All flaws must be in or near the butt weld heat-affected zone, open to the inside surface, and extending at least

Comparison of the ASME Code, Section XI, Supplement 11 to ASME Code Case N-653 and the EPRI PDI Program		
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and extending at least 75% through the base metal wall. Flaws may extend 100% through the base metal and into the overlay material; in this case, intentional overlay fabrication flaws shall not interfere with ultrasonic detection or characterization of the cracking. Specimens containing IGSCC shall be used when available.	75% through the base metal wall. Intentional overlay fabrication flaws shall not interfere with ultrasonic detection or characterization of the cracking. Specimens containing IGSCC shall be used when available. At least 70% of the flaws in the detection and sizing tests shall be cracks. Alternative flaw mechanisms, if used, shall provide crack-like reflective characteristics and shall be limited by the following: (a) Flaws shall be limited to when implantation of cracks precludes obtaining a realistic ultrasonic response. (b) Flaws shall be semielliptical with a tip width of less than or equal to 0.002 inches.	75% through the base metal wall. Intentional overlay fabrication flaws shall not interfere with ultrasonic detection or characterization of the **base metal flaws**. Specimens containing IGSCC shall be used when available. At least 70% of the flaws in the detection and sizing tests shall be cracks **and the remainder shall be alternative flaws**. Alternative flaw mechanisms, if used, shall provide crack-like reflective characteristics and shall be limited by the following: (a) Flaws shall be limited to when implantation of cracks precludes obtaining an effective ultrasonic response. (b) Flaws shall be semielliptical with a tip width of less than or equal to 0.002 inches.
(2) Overlay fabrication flaws. At least 40% of the flaws shall be non-crack fabrication flaws (e.g., sidewall lack of fusion or laminar lack of bond) in the overlay or the pipe-to-overlay interface.	No Change	No Change

Comparison of the ASME Code, Section XI, Supplement 11 to ASME Code Case N-653 and the EPRI PDI Program		
American Society of Mechanical Engineers (ASME) Code, Section XI, Supplement 11	**ASME Code Case N-653**	**Performance Demonstration Initiative Program**
At least 20% of the flaws shall be cracks. The balance of the flaws shall be of either type.		
(e) Detection Specimens		
(1) At least 20% but less than 40% of the flaws shall be oriented within ±20 degrees of the pipe axial direction. The remainder shall be oriented circumferentially. Flaws shall not be open to any surface to which the candidate has physical or visual access. The rules of IWA-3300 shall be used to determine whether closely spaced flaws should be treated as single or multiple flaws.	(1) At least 20% but less than 40% of the base metal flaws shall be oriented within ±20 degrees of the pipe axial direction. The remainder shall be oriented circumferentially. Flaws shall not be open to any surface to which the candidate has physical or visual access.	(1) At least 20% but less than 40% of the base metal flaws shall be oriented within ±20 degrees of the pipe axial direction. The remainder shall be oriented circumferentially. Flaws shall not be open to any surface to which the candidate has physical or visual access.
(2) Specimens shall be divided into base and over-lay grading units. Each specimen shall contain one or both types of grading units.	(2) Specimens shall be divided into base metal and overlay fabrication grading units. Each specimen shall contain one or both types of grading units. Flaws shall not interfere with ultrasonic detection or characterization of other flaws.	(2) Specimens shall be divided into base metal and overlay fabrication grading units. Each specimen shall contain one or both types of grading units. Flaws shall not interfere with ultrasonic detection or characterization of other flaws.
(a)(1) A base grading unit shall include at least 3 inch of the length of the overlaid	*(a)(1)* A base metal grading unit shall include at least 1 inch of the length of the	*(a)(1)* A base metal grading unit shall include at least 1 inch of the length of the

Comparison of the ASME Code, Section XI, Supplement 11 to ASME Code Case N-653 and the EPRI PDI Program		
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weld. The base grading unit includes the outer 25% of the overlaid weld and base metal on both sides. The base grading unit shall not include the inner 75% of the overlaid weld and base metal overlay material, or base metal-to-overlay interface.	overlaid weld. The base metal grading unit includes the outer 25% of the overlaid weld and base metal on both sides. The base metal grading unit shall not include the inner 75% of the overlaid weld and base metal overlay material, or base metal-to-overlay interface.	overlaid weld. The base metal grading unit includes the outer 25% of the overlaid weld. The base metal grading unit shall not include the inner 75% of the overlaid weld and base metal overlay material, or base metal-to-overlay interface.
(a)(2) When base metal cracking penetrates into the overlay material, the base grading unit shall include the overlay metal within 1 inch of the crack location. This portion of the overlay material shall not be used as part of any overlay grading unit.	(a)(2) When base metal cracking penetrates into the overlay material, the base metal grading unit shall not be used as part of any overlay fabrication grading unit.	(a)(2) When base metal **flaws penetrate** into the overlay material, the base metal grading unit shall not be used as part of any overlay fabrication grading unit.
(a)(3) When a base grading unit is designed to be unflawed, at least 1 inch of unflawed overlaid weld and base metal shall exist on either side of the base grading unit. The segment of weld length used in one base grading unit shall not be used in another base grading unit. Base grading units need not be uniformly	(a)(3) Sufficient unflawed overlaid weld and base metal shall exist on all sides of the grading unit to preclude interfering reflections from adjacent flaws.	(a)(3) Sufficient unflawed overlaid weld and base metal shall exist on all sides of the grading unit to preclude interfering reflections from adjacent flaws.

Comparison of the ASME Code, Section XI, Supplement 11 to ASME Code Case N-653 and the EPRI PDI Program		
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spaced around the specimen.		
(b)(l) An overlay grading unit shall include the overlay material and the base metal-to-overlay interface of at least 6 square inches. The overlay grading unit shall be rectangular, with minimum dimensions of 2 inches.	*(b)*(l) An overlay fabrication grading unit shall include the overlay material and the base metal-to-overlay interface for a length of at least 1 inch.	*(b)*(l) An overlay fabrication grading unit shall include the overlay material and the base metal-to-overlay interface for a length of at least 1 inch.
(b)(2) An overlay grading unit designed to be unflawed shall be surrounded by unflawed overlay material and unflawed base metal-to-overlay interface for at least 1 inch around its entire perimeter. The specific area used in one overlay grading unit shall not be used in another overlay grading unit. Overlay grading units need not be spaced uniformly about the specimen.	(b)(2) Overlay fabrication grading units designed to be unflawed shall be separated by unflawed overlay material and unflawed base metal-to-overlay interface for at least 1 inch at both ends. Sufficient unflawed overlaid weld and base metal shall exist on both sides of the overlay fabrication grading unit to preclude interfering reflections from adjacent flaws. The specific area used in one overlay fabrication grading unit shall not be used in another overlay fabrication grading unit. Overlay fabrication grading units need not be spaced uniformly about the specimen.	(b)(2) Overlay fabrication grading units designed to be unflawed shall be separated by unflawed overlay material and unflawed base metal-to-overlay interface for at least 1 inch at both ends. Sufficient unflawed overlaid weld and base metal shall exist on both sides of the overlay fabrication grading unit to preclude interfering reflections from adjacent flaws. The specific area used in one overlay fabrication grading unit shall not be used in another overlay fabrication grading unit. Overlay fabrication grading units need not be spaced uniformly about the specimen.
(b)(3) Detection sets shall be selected from Table VIII-S2-1. The minimum	(b)(3) Detection sets shall be selected from Table VIII-S2-1. The minimum detection	(b)(3) Detection sets shall be selected from Table VIII-S2-1. The minimum detection

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American Society of Mechanical Engineers (ASME) Code, Section XI, Supplement 11	**ASME Code Case N-653**	**Performance Demonstration Initiative Program**
detection sample set is five flawed base grading units, ten unflawed base grading units, five flawed overlay grading units, and ten unflawed overlay grading units. For each type of grading unit, the set shall contain at least twice as many unflawed as flawed grading units.	sample set is five flawed base metal grading units, ten unflawed base metal grading units, five flawed overlay fabrication grading units, and ten unflawed overlay fabrication grading units. For each type of grading unit, the set shall contain at least twice as many unflawed as flawed grading units. For initial procedure qualification, detection sets shall include the equivalent of three personnel qualification sets. To qualify new values of essential variables, at least one personnel qualification set is required.	sample set is five flawed base metal grading units, ten unflawed base metal grading units, five flawed overlay fabrication grading units, and ten unflawed overlay fabrication grading units. For each type of grading unit, the set shall contain at least twice as many unflawed as flawed grading units. For initial procedure qualification, detection sets shall include the equivalent of three personnel qualification sets. To qualify new values of essential variables, at least one personnel qualification set is required.
(f) Sizing Specimen		
(1) The minimum number of flaws shall be ten. At least 30% of the flaws shall be overlay fabrication flaws. At least 40% of the flaws shall be cracks open to the inside surface.	(1) The minimum number of flaws shall be ten. At least 30% of the flaws shall be overlay fabrication flaws. At least 40% of the flaws shall be cracks open to the inside surface. For initial procedure qualification, sizing sets shall include the equivalent of three personnel qualification sets. To qualify new values of essential variables, at least one personnel qualification set is required.	(1) The minimum number of flaws shall be ten. At least 30% of the flaws shall be overlay fabrication flaws. At least 40% of the flaws **shall be open** to the inside surface. For initial procedure qualification, sizing sets shall include the equivalent of three personnel qualification sets. To qualify new values of essential variables, at least one personnel qualification set is required.

Comparison of the ASME Code, Section XI, Supplement 11 to ASME Code Case N-653 and the EPRI PDI Program		
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(2) At least 20% but less than 40% of the flaws shall be oriented axially. The remainder shall be oriented circumferentially. Flaws shall not be open to any surface to which the candidate has physical or visual access.	No Change	No Change
(3) Base metal cracking used for length sizing demonstrations shall be oriented circumferentially.	No Change	(3) Base metal **flaws** used for length sizing demonstrations shall be oriented circumferentially.
(4) Depth sizing specimen sets shall include at least two distinct locations where cracking in the base metal extends into the overlay material by at least 0.1 inch in the through-wall direction.	No Change	(4) Depth sizing specimen sets shall include at least two distinct locations where **flaws** in the base metal **extend** into the overlay material by at least 0.1 inch in the through-wall direction.
2.0 CONDUCT OF PERFORMANCE DEMONSTRATION		
The specimen inside surface and identification shall be concealed from the candidate. All examinations shall be completed prior to grading the results and presenting the results to the candidate. Divulgence of particular specimen results	The specimen inside surface and identification shall be concealed from the candidate. All examinations shall be completed prior to grading the results and presenting the results to the candidate. Divulgence of particular specimen results or	The specimen inside surface and identification shall be concealed from the candidate. All examinations shall be completed prior to grading the results and presenting the results to the candidate. Divulgence of particular specimen results or

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or candidate viewing of unmasked specimens after the performance demonstration is prohibited.	candidate viewing of unmasked specimens after the performance demonstration is prohibited. The overlay fabrication flaw test and the base metal flaw test may be performed separately.	candidate viewing of unmasked specimens after the performance demonstration is prohibited. The overlay fabrication flaw test and the base metal flaw test may be performed separately.
2.1 Detection Test		
Flawed and unflawed grading units shall be randomly mixed. Although the boundaries of specific grading units shall not be revealed to the candidate, the candidate shall be made aware of the type or types of grading units (base or overlay) that are present for each specimen.	Flawed and unflawed grading units shall be randomly mixed. Although the boundaries of specific grading units shall not be revealed to the candidate, the candidate shall be made aware of the type or types of grading units (base metal or overlay fabrication) that are present for each specimen.	Flawed and unflawed grading units shall be randomly mixed. Although the boundaries of specific grading units shall not be revealed to the candidate, the candidate shall be made aware of the type or types of grading units (base metal or overlay fabrication) that are present for each specimen.
2.2 Length Sizing Test		
(a) The length sizing test may be conducted separately or in conjunction with the detection test.	No Change	No Change
(b) When the length sizing test is conducted in conjunction with the detection test and the detected flaws do not satisfy the requirements of 1.1(f),	No Change	No Change

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American Society of Mechanical Engineers (ASME) Code, Section XI, Supplement 11	**ASME Code Case N-653**	**Performance Demonstration Initiative Program**
additional specimens shall be provided to the candidate. The regions containing a flaw to be sized shall be identified to the candidate. The candidate shall determine the length of the flaw in each region.		
(c) For a separate length sizing test, the regions of each specimen containing a flaw to be sized shall be identified to the candidate. The candidate shall determine the length of the flaw in each region.	No Change	No Change
(d) For flaws in base grading units, the candidate shall estimate the length of that part of the flaw that is in the outer 25% of the base wall thickness.	*(d)* For flaws in base metal grading units, the candidate shall estimate the length of that part of the flaw that is in the outer 25% of the base metal wall thickness.	*(d)* For flaws in base metal grading units, the candidate shall estimate the length of that part of the flaw that is in the outer 25% of the base metal wall thickness.
2.3 Depth Sizing Test		
For the depth sizing test, 80% of the flaws shall be sized at a specific location on the surface of the specimen identified to the candidate. For the remaining flaws, the regions of each specimen containing a flaw to be sized shall be identified to the candidate. The candidate shall determine	The candidate shall determine the depth of the flaw in each region.	The candidate shall determine the depth of the flaw in each region.

Comparison of the ASME Code, Section XI, Supplement 11 to ASME Code Case N-653 and the EPRI PDI Program		
American Society of Mechanical Engineers (ASME) Code, Section XI, Supplement 11	**ASME Code Case N-653**	**Performance Demonstration Initiative Program**
the maximum depth of the flaw in each region.		
3.0 ACCEPTANCE CRITERIA		
3.1 Detection Acceptance Criteria		
Examination procedures, equipment, and personnel are qualified for detection when the results of the performance demonstration satisfy the acceptance criteria of Table VIII-S2-1 for both detection and false calls. The criteria shall be satisfied separately by the demonstration results for base grading units and for overlay grading units.	Examination procedures are qualified for detection when all flaws within the scope of the procedure are detected and the results of the performance demonstration satisfy the acceptance criteria of Table VIII-S2-1 for false calls. Examination equipment and personnel are qualified for detection when the results of the performance demonstration satisfy the acceptance criteria of Table VIII-S2-1 for both detection and false calls. The criteria shall be satisfied separately by the demonstration results for base metal grading units and for overlay fabrication grading units.	Examination procedures are qualified for detection when all flaws within the scope of the procedure are detected and the results of the performance demonstration satisfy the acceptance criteria of Table VIII-S2-1 for false calls. Examination equipment and personnel are qualified for detection when the results of the performance demonstration satisfy the acceptance criteria of Table VIII-S2-1 for both detection and false calls. The criteria shall be satisfied separately by the demonstration results for base metal grading units and for overlay fabrication grading units.
3.2 Sizing Acceptance Criteria		
Examination procedures, equipment, and personnel are qualified for sizing when the	No Change	No Change

Comparison of the ASME Code, Section XI, Supplement 11 to ASME Code Case N-653 and the EPRI PDI Program		
American Society of Mechanical Engineers (ASME) Code, Section XI, Supplement 11	**ASME Code Case N-653**	**Performance Demonstration Initiative Program**
results of the performance demonstration satisfy the following criteria.		
(a) The RMS error of the flaw length measurements, as compared to the true flaw lengths, is less than or equal to 0.75 inch. The length of base metal cracking is measured at the 75% through-base-metal position.	No Change	*(a)* The RMS error of the flaw length measurements, as compared to the true flaw lengths, is less than or equal to 0.75 inch. The length of base metal **flaws** is measured at the 75% through-base-metal position.
(b) All extensions of base metal cracking into the overlay material by at least 0.1 inch are reported as being intrusions into the overlay material.	This requirement is omitted.	This requirement is omitted.
(c) The RMS error of the flaw depth measurements, as compared to the true flaw depths, is less than or equal to 0.125 inch.	*(b)* The RMS error of the flaw depth measurements, as compared to the true flaw depths, is less than or equal to 0.125 inch.	*(b)* The RMS error of the flaw depth measurements, as compared to the true flaw depths, is less than or equal to 0.125 inch.