Progress Energy

C. S. Hinnant
Sr. Vice President and Chief Nuclear Officer
Progress Energy, Inc.

December 5, 2003

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

SERIAL: PE&RAS 03-0102

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

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400 / LICENSE NO. NPF-63

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261 / LICENSE NO. DPR-23

CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT
DOCKET NO. 50-302 / LICENSE NO. DPR-72

REQUESTS FOR RELIEF FROM ASME CODE, SECTION XI, APPENDIX VIII, SUPPLEMENT 10, "QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS"

Ladies and Gentlemen:

Progress Energy Carolinas, Inc. (PEC) and Progress Energy Florida, Inc. (PEF) submit the following Relief Requests for the Progress Energy plants listed in Table 1 below. We request approval by April 1, 2004 to support our Robinson Plant refueling outage.

PEC is the principal licensee for the H. B. Robinson Steam Electric Plant, Unit No. 2; the Brunswick Steam Electric Plant, Unit Nos. 1 and 2; and the Shearon Harris Nuclear Power Plant, Unit No. 1. PEF is the principal licensee for the Crystal River Unit 3 Nuclear Generating Plant.

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P.O. Box 1551
PEB 1323
Raleigh, NC 27602

T> 919.546.4222
F> 919.546.5473

TABLE 1

List of plants, type, ISI 10-year interval, ASME Code of record, and Relief Request number.

PLANT/TYPE/RR #	ISI INTERVAL	ASME EDITION	ISI START DATE	ISI END DATE	DOCKET #
Brunswick Steam Electric Plant, Unit 1, BWR, RR-32	Third	1989 Edition, no addenda	May 11, 1998	May 10, 2008	50-325
Brunswick Steam Electric Plant, Unit 2, BWR, RR-32	Third	1989 Edition, no addenda	May 11, 1998	May 10, 2008	50-324
Crystal River Nuclear Generating Plant, Unit 3, PWR, RR-03-001-II	Third	1989 Edition, no addenda	August 14, 1998	August 13, 2008	50-302
Shearon Harris Nuclear Power Plant, Unit 1, PWR, RR-2R1-014	Second	1989 Edition, no addenda	February 2, 1998	May 1, 2007	50-400
H.B. Robinson Steam Electric Plant, Unit 2, PWR, RR-19	Fourth	1995 Edition, 1996 addenda	February 19, 2002	February 18, 2012	50-261

This Relief Request is submitted in accordance with 10 CFR 50.55a(a)(3)(i), and applies to the program required by 10 CFR 50.55a(g)(6)(ii)(C) to implement Supplement 10 to Appendix VIII of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI (i.e., referred to hereafter as Supplement 10).

Relief is requested to use an alternative program for implementation of Supplement 10 requirements, as presented in the enclosed Relief Request. The alternative program will be implemented through the Performance Demonstration Initiative (PDI) Program.

The final rule published in the *Federal Register* on September 22, 1999 (i.e., 64 FR 51370), requires implementation of a program, by November 22, 2002, to comply with Supplement 10. Supplement 10 contains the qualification requirements for procedures, equipment, and personnel involved with examining dissimilar metal welds using ultrasonic techniques. This scope is commonly known as performance-based criteria to improve the ability of an examiner to detect and characterize flaws during examination of components to provide more reliable examination results.

The industry has implemented a PDI program and has developed an alternative program to implement Supplement 10. The alternative program is based on forthcoming ASME Code changes and was generated from a PDI model prepared by the Electric Power Research Institute (EPRI). The alternative program has been submitted to the ASME Code organization for consideration and, as of December 2002, has been approved by the non-destructive examination (NDE) subcommittee. PEC has been a participant in the industry-sponsored program through the Nuclear Energy Institute (NEI) and EPRI. PEC and PEF plants will implement the alternative program when approved by the applicable ASME Code and regulatory actions.

The inability to meet the 10 CFR 50.55a(g)(6)(ii)(C) required schedule of November 22, 2002, to have a Supplement 10 program in place has not impacted the safe operation of PEC and PEF plants, because the program is intended for use during an outage for dissimilar metal weld examinations. As described in NRC Regulatory Issue Summary 2003-01, "Examination of Dissimilar Metal Welds, Supplement 10 to Appendix VIII of Section XI of the ASME Code," dated January 21, 2003, until regulatory compliance is achieved, any system operability issues arising from the inability to comply with Supplement 10 will be addressed consistent with NRC Generic Letter 91-18.

The proposed alternative program described in the enclosed Relief Request follows the scope of Supplement 10, with the enhancements, clarifications, and refinements approved by the ASME Code Non-Destructive Examination (NDE) subcommittee, and provides an acceptable level of quality and safety as required by 10 CFR 50.55a(a)(3)(i). Approval is requested by April 1, 2004.

There are no new commitments made in this letter. Please refer any questions regarding this submittal to Mr. Tony Groblewski, at (919) 546-4579.

Sincerely,

C S Hinnant

C. S. Hinnant
Senior Vice President and
Chief Nuclear Officer

CSH/kmh

Enclosures:

1. Relief Request, "Examination of Dissimilar Metal Welds"
2. Supplemental Information Provided by the Performance Demonstration Initiative (PDI)

cc (with enclosures):

U. S. Nuclear Regulatory Commission, Region II
ATTN: Mr. Luis A. Reyes, Regional Administrator, 23 T85
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8931

U. S. Nuclear Regulatory Commission
ATTN: Mr. Eugene M. Dipaolo - NRC Senior Resident Inspector
Brunswick Steam Electric Plant
8470 River Road
Southport, NC 28461-8869

U. S. Nuclear Regulatory Commission
ATTN: Senior Resident Inspector
Crystal River Nuclear Power Plant
6745 N. Tallahassee Rd.
Crystal River, FL 34428

U. S. Nuclear Regulatory Commission
ATTN: NRC Senior Resident Inspector
H. B. Robinson Steam Electric Plant
2112 Old Camden Road
Hartsville, SC 29550

U. S. Nuclear Regulatory Commission
ATTN: NRC Senior Resident Inspector
Shearon Harris Nuclear Power Plant
5413 Shearon Harris Rd.
New Hill, NC 27562-9300

U. S. Nuclear Regulatory Commission **(Electronic Copy Only)**
ATTN: Ms. Brenda L. Mozafari (Mail Stop OWFN 8G9)
11555 Rockville Pike
Rockville, MD 20852-2738

U. S. Nuclear Regulatory Commission **(Electronic Copy Only)**
ATTN: Mr. Chandu P. Patel (Mail Stop OWFN 8H12)
11555 Rockville Pike
Rockville, MD 20852-2738

Ms. Jo A. Sanford
Chair - North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, NC 27699-4325

Division of Boiler and Pressure Vessel
North Carolina Department of Labor
ATTN: Mr. Jack Given, Bureau Chief
1101 Mail Service Center
Raleigh, NC 27699-1101

RELIEF REQUEST: Examination of Dissimilar Metal Welds

Revision 0

COMPONENTS FOR WHICH RELIEF IS REQUESTED

The relief requested applies to pressure-retaining piping welds subject to examination using procedures, personnel, and equipment qualified to American Society of Mechanical Engineers (ASME) Code, Section XI, Appendix VIII, Supplement 10 criteria.

APPLICABLE CODE EDITION AND ADDENDA

ASME Boiler and Pressure Vessel Code, Section XI, Edition and Addenda are listed in Table 1 of the cover letter.

APPLICABLE CODE REQUIREMENT

The following paragraphs or statements are from ASME Code, Section XI, Appendix VIII, Supplement 10 and identify the specific requirements that are included in this request for relief.

Item 1 – Paragraph 1.1(b) states in part – Pipe diameters within a range of 0.9 to 1.5 times a nominal diameter shall be considered equivalent.

Item 2 – Paragraph 1.1(d) states – All flaws in the specimen set shall be cracks.

Item 3 – Paragraph 1.1(d)(1) states - At least 50% of the cracks shall be in austenitic material. At least 50% of the cracks in austenitic material shall be contained wholly in weld or buttering material. At least 10% of the cracks shall be in ferritic material. The remainder of the cracks may be in either austenitic or ferritic material.

Item 4 – Paragraph 1.2(b) states in part – The number of unflawed grading units shall be at least twice the number of flawed grading units.

Item 5 – Paragraph 1.2(c)(1) and 1.3(c) state in part – At least 1/3 of the flaws, rounded to the next higher whole number, shall have depths between 10% and 30% of the nominal pipe wall thickness. Paragraph 1.4(b) distribution table requires 20% of the flaws to have depths between 10% and 30%.

Item 6 – Paragraph 2.0 first sentence states – The specimen inside surface and identification shall be concealed from the candidate.

Item 7 – Paragraph 2.2(b) states in part – The regions containing a flaw to be sized shall be identified to the candidate.

Item 8 – Paragraph 2.2(c) states in part – For a separate length sizing test, the regions of each specimen containing a flaw to be sized shall be identified to the candidate.

Item 9 – Paragraph 2.3(a) states – 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.

Item 10 – Paragraph 2.3(b) states – 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 maximum depth of the flaw in each region.

Item 11 – Table VIII-S2-1 provides the false call criteria when the number of unflawed grading units is at least twice the number of flawed grading units.

RELIEF REQUESTED

Relief is requested to use alternative requirements for implementation of Appendix VIII, Supplement 10 requirements. They will be implemented through the Performance Demonstration Initiative (PDI) Program.

As provided by the PDI in Enclosure 2, a copy of the proposed revision to Supplement 10 is attached. It identifies the proposed alternatives and allows them to be viewed in context. Enclosure 2 also identifies additional clarifications and enhancements, for information.

BASIS FOR RELIEF

In accordance with 10 CFR 50.55a(a)(3)(i), in lieu of the requirements of the ASME Code, Section XI, 1995 Edition with 1996 Addenda, Appendix VIII, Supplement 10, the proposed alternative discussed below shall be used. Compliance with the proposed alternative will provide an acceptable level of quality and safety for examination of the affected welds.

Item 1 – The proposed alternative to Paragraph 1.1(b) is:

"The specimen set shall include the minimum and maximum pipe diameters and thicknesses for which the examination procedure is applicable. Pipe diameters within a range of 1/2 inch (13 mm) of the nominal diameter shall be considered equivalent. Pipe diameters larger than 24 inch (610 mm) shall be considered to be flat. When a range of thicknesses is to be examined, a thickness tolerance of $\pm$25% is acceptable."

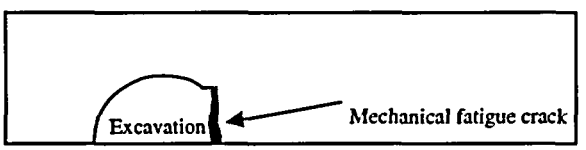
Technical Basis – The change in the minimum pipe diameter tolerance from 0.9 times the diameter to the nominal diameter minus 0.5 inch provides tolerances more in line with

industry practice. Though the alternative is less stringent for small pipe diameters, they typically have a thinner wall thickness than larger diameter piping. A thinner wall thickness results in shorter sound path distances that reduce the detrimental effects of the curvature. This change maintains consistency between Supplement 10 and the recent revision to Supplement 2.

Item 2 – The proposed alternative to Paragraph 1.1(d) states:

"At least 60% of the flaws shall be cracks, the remainder shall be alternative flaws. Specimens with Intergranular Stress Corrosion Cracking (IGSCC) shall be used when available. Alternative flaws, if used, shall provide crack-like reflective characteristics and shall be limited to the case where implantation of cracks produces spurious reflectors that are uncharacteristic of service induced flaws. Alternative flaw mechanisms shall have a tip width of less than or equal to 0.002 inch (.05 mm)."

Technical Basis – 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. In addition, it is important to preserve the dendritic structure present in field welds that would otherwise be destroyed by the implantation process. To resolve these issues, the proposed alternative allows the use of up to 40% fabricated flaws as an alternative flaw mechanism under controlled conditions. The fabricated flaws are isostatically compressed which produces ultrasonic reflective characteristics similar to tight cracks. To avoid confusion, the proposed alternative modifies instances of the term "cracks" or "cracking" to the term "flaws" because of the use of "alternative flaw mechanisms."



Item 3 – The proposed alternative to Paragraph 1.1(d)(1) states:

"At least 80% of the flaws shall be contained wholly in weld or buttering material. At least one and a maximum of 10% of the flaws shall be in ferritic base material. At least one and a maximum of 10% of the flaws shall be in austenitic base material."

Technical Basis – Under the current Code, as few as 25% of the flaws are contained in austenitic weld or buttering material. The metallurgical structure of austenitic weld material is ultrasonically more challenging than either ferritic or austenitic base material. The proposed alternative is therefore more challenging than the current Code.

Item 4 – The proposed alternative to Paragraph 1.2(b) states:

"Detection sets shall be selected from Table VIII-S10-1. The number of unflawed grading units shall be at least one and a half times the number of flawed grading units."

Technical Basis – New Table VIII-S10-1 provides a statistically based ratio between the number of unflawed grading units and the number of flawed grading units. Based on information provided by the PDI, the proposed alternative reduces the ratio to 1.5 times to reduce the number of test samples to a more reasonable number. However, the statistical basis used for screening personnel and procedures is still maintained at the same level with competent personnel being successful and less skilled personnel being unsuccessful. The acceptance criteria for the statistical bases are in Table VIII-S10-1.

Item 5 – The proposed alternative to the flaw distribution requirements of Paragraph 1.2(c)(1) (detection) and 1.3(c) (length) is to use the Paragraph 1.4(b) (depth) distribution table (see below) for all qualifications.

Flaw Depth (% Wall Thickness)	Minimum Number of Flaws
10 to 30%	20%
31 to 60%	20%
61 to 100%	20%

Technical Basis – The proposed alternative uses the depth sizing distribution for both detection and depth sizing because it provides for a better distribution of flaw sizes within the test set. This distribution allows candidates to perform detection, length, and depth sizing demonstrations simultaneously utilizing the same test set. The requirement that at least 75% of the flaws shall be in the range of 10 to 60% of wall thickness provides an overall distribution tolerance, yet the distribution uncertainty decreases the possibilities for testmanship that would be inherent to a uniform distribution. It must be noted that it is possible to achieve the same distribution utilizing the present requirements, but it is preferable to make the criteria consistent.

Item 6 – The proposed alternative to Paragraph 2.0 first sentence states:

"For qualifications from the outside surface, the specimen inside surface and identification shall be concealed from the candidate. When qualifications are performed from the inside surface, the flaw location and specimen identification shall be obscured to maintain a 'blind test'."

Technical Basis – The current Code requires that the inside surface be concealed from the candidate. This makes qualifications conducted from the inside of the pipe (e.g., Pressurized Water Reactor nozzle to safe end welds) impractical. The proposed alternative differentiates between Inside Diameter (ID) and Outside Diameter (OD) scanning surfaces, requires that they be conducted separately, and requires that flaws be concealed from the candidate. This is consistent with the recent revision to Supplement 2 of ASME Code Section XI, Division 1, Appendix XIII, "Qualification Requirements for Wrought Austenitic Piping Welds."

Items 7 and 8 – The proposed alternatives to Paragraph 2.2(b) and 2.2(c) state:

"... containing a flaw to be sized may be identified to the candidate."

Technical Basis – The current Code requires that the regions of each specimen containing a flaw to be length sized shall be identified to the candidate. The candidate shall determine the length of the flaw in each region (note that length and depth sizing use the term "regions" while detection uses the term "grading units"). To ensure security of the samples, the proposed alternative modifies the first "shall" to a "may" to allow the test administrator the option of not identifying specifically where a flaw is located. This is consistent with the recent revision to Supplement 2 of ASME Code Section XI, Division 1, Appendix XIII, "Qualification Requirements for Wrought Austenitic Piping Welds."

Items 9 and 10 – The proposed alternatives to Paragraph 2.3(a) and 2.3(b) state:

"... regions of each specimen containing a flaw to be sized may be identified to the candidate."

Technical Basis – The current Code requires that a large number of flaws be sized at a specific location. The proposed alternative changes the "shall" to a "may" which modifies this from a specific area to a more generalized region to ensure security of samples. This is consistent with the recent revision to Supplement 2 of ASME Code Section XI, Division 1, Appendix XIII, "Qualification Requirements for Wrought Austenitic Piping Welds." It also incorporates terminology from length sizing for additional clarity.

Item 11 – The proposed alternative modifies the acceptance criteria of Table VIII-S2-1 as follows:

Table VIII-S-~~2~~-10-1 PERFORMANCE DEMONSTRATION DETECTION TEST ACCEPTANCE CRITERIA					
Detection Test Acceptance Criteria		False Call Test Acceptance Criteria			
No. of Flawed Grading Units	Minimum Detection Criteria	No. of Unflawed Grading Units		Maximum Number of False Calls	
~~5~~	~~5~~	~~10~~		~~0~~	
~~6~~	~~6~~	~~12~~		~~1~~	
~~7~~	~~6~~	~~14~~		~~1~~	
~~8~~	~~7~~	~~16~~		~~2~~	
~~9~~	~~7~~	~~18~~		~~2~~	
10	8	~~20~~	15	~~3~~	2
11	9	~~22~~	17	~~3~~	3
12	9	~~24~~	18	~~3~~	3
13	10	~~26~~	20	~~4~~	3
14	10	~~28~~	21	~~5~~	3
15	11	~~30~~	23	~~5~~	3
16	12	~~32~~	24	~~6~~	4
17	12	~~34~~	26	~~6~~	4
18	13	~~36~~	27	~~7~~	4
19	13	~~38~~	29	~~7~~	4
20	14	~~40~~	30	~~8~~	5

Technical Basis – The proposed alternative adds new Table VIII-S10-1 above. It is a modified version of Table VIII-S2-1 to reflect the reduced number of unflawed grading units and allowable false calls. As provided by the PDI, as part of ongoing ASME Code activities, Pacific Northwest National Laboratories has reviewed the statistical significance of these revisions and offered the new Table VIII-S10-1.

ALTERNATIVE EXAMINATION

In accordance with the alternative provisions of 10 CFR 50.55a(a)(3)(i), Progress Energy Carolinas, Inc. and Progress Energy Florida, Inc. propose that in lieu of the requirements of the ASME Code, Section XI, 1995 Edition with 1996 Addenda, Appendix VIII, Supplement 10, the required examinations will be implemented through the Electric Power Research Institute (EPRI) PDI Program. The proposed alternative is described in Enclosure 2.

IMPLEMENTATION SCHEDULE

The proposed alternative is applicable for the remainder of the ten year inservice inspection interval.

PRECEDENTS

Letter from James W. Clifford (USNRC) to Mr. Mike Bellamy (Entergy Nuclear Operations, Inc., Pilgrim Nuclear Power Station) dated May 6, 2003, "Pilgrim Nuclear Power Station – Pilgrim Relief Request No. 30, Relief From ASME Code, Section XI, Appendix VIII, Supplement 10, 'Performance Demonstration for Ultrasonic Examination Systems' (TAC No. MB7949)." [ADAMS Accession Number ML0312701490]

REFERENCES

None.

Supplemental Information Provided by the Performance Demonstration Initiative (PDI)
Performance Demonstration Initiatives

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
	1.0 SCOPE	
	Supplement 10 is applicable to dissimilar metal piping welds examined from either the inside or outside surface. Supplement 10 is not applicable to piping welds containing supplemental corrosion resistant clad (CRC) applied to mitigate Intergranular Stress Corrosion Cracking (IGSCC).	A scope statement provides added clarity regarding the applicable range of each individual Supplement. The exclusion of CRC provides consistency between Supplement 10 and the recent revision to Supplement 2 (Reference BC 00-755). Note, an additional change identifying CRC as "in course of preparation" is being processed separately.
1.0 SPECIMEN REQUIREMENTS	**2.0 SPECIMEN REQUIREMENTS**	Renumbered
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.	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
1.1 General. The specimen set shall conform to the following requirements.	**2.1 General.** The specimen set shall conform to the following requirements.	Renumbered

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
	(a) The minimum number of flaws in a test set shall be ten.	New, changed minimum number of flaws to ten so sample set size for detection is consistent with length and depth sizing.
(a) Specimens shall have sufficient volume to minimize spurious reflections that may interfere with the interpretation process.	(b) Specimens shall have sufficient volume to minimize spurious reflections that may interfere with the interpretation process.	Renumbered
(b) The specimen set shall include the minimum and maximum pipe diameters and thicknesses 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. Pipe diameters larger than 24 inch shall be considered to be flat. When a range of thicknesses is to be examined, a thickness tolerance of ±25% is acceptable.	(c) The specimen set shall include the minimum and maximum pipe diameters and thicknesses for which the examination procedure is applicable. Pipe diameters within a range of 1/2 inch (13 mm) of the nominal diameter shall be considered equivalent. Pipe diameters larger than 24 inch (610 mm) shall be considered to be flat. When a range of thicknesses is to be examined, a thickness tolerance of ±25% is acceptable.	Renumbered, metricated, the change in pipe diameter tolerance provides consistency between Supplement 10 and the recent revision to Supplement 2 (Reference BC 00-755).
(c) The specimen set shall include examples of the following fabrication condition:	(d) The specimen set shall include examples of the following fabrication conditions:	Renumbered, changed "condition" to "conditions."
(1) geometric conditions that normally require discrimination from flaws (e.g., counterbore or weld root conditions, cladding, weld buttering, remnants of previous welds, adjacent welds in close proximity);	(1) geometric and material conditions that normally require discrimination from flaws (e.g., counterbore or weld root conditions, cladding, weld buttering, remnants of previous welds, adjacent welds in close proximity, and weld repair areas);	Clarification, some of the items listed relate to material conditions rather than geometric conditions. Weld repair areas were added as a result of recent field experiences.

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
(2) typical limited scanning surface conditions (e.g., diametrical shrink, single-side access due to nozzle and safe end external tapers).	(2) typical limited scanning surface conditions shall be included as follows: (a) for outside surface examination, weld crowns, diametrical shrink, single-side access due to nozzle and safe end external tapers (b) for inside surface examination, internal tapers, exposed weld roots, and cladding conditions Qualification requirements shall be satisfied separately for outside surface and inside surface examinations.	Differentiates between ID and OD scanning surface limitations. Requires that ID and OD qualifications be conducted independently (Note, new paragraph 2.0 (identical to old paragraph 1.0) provides for alternatives when "a set of specimens is designed to accommodate specific limitations stated in the scope of the examination procedure").
(d) All flaws in the specimen set shall be cracks.		Deleted this requirement, because new paragraph 2.3 below provides for the use of "alternative flaws" in lieu of cracks.
(1) At least 50% of the cracks shall be in austenitic material. At least 50% of the cracks in austenitic material shall be contained wholly in weld or buttering material. At least 10% of the cracks shall be in ferritic material. The remainder of the cracks may be in either austenitic or ferritic material.	**2.2 Flaw Location.** At least 80% of the flaws shall be contained wholly in weld or buttering material. At least one and no more than 10% of the flaws shall be in ferritic base material. At least one and no more than 10% of the flaws shall be in austenitic base material.	Renumbered and re-titled. Flaw location percentages redistributed because field experience indicates that flaws contained in weld or buttering material are probable and represent the more stringent ultrasonic detection scenario.

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
(2) At least 50% of the cracks in austenitic base material shall be either IGSCC or thermal fatigue cracks. At least 50% of the cracks in ferritic material shall be mechanically or thermally induced fatigue cracks.	**2.3 Flaw Type.** (a) At least 60% of the flaws shall be cracks, the remainder shall be alternative flaws. Specimens with IGSCC shall be used when available. Alternative flaws shall meet the following requirements (1) Alternative flaws, if used, shall provide crack-like reflective characteristics and shall only be used when implantation of cracks would produce spurious reflectors that are uncharacteristic of service induced flaws. (2) Alternative flaws shall have a tip width of no more than 0.002 inch (0.05 mm).	Renumbered and re-titled. Alternative flaws are required for placing axial flaws in the HAZ of the weld and other areas where implantation of a crack produces metallurgical conditions that result in an unrealistic ultrasonic response. This is consistent with the recent revision to Supplement 2 (Reference BC 00-755). The 40% limit on alternative flaws is needed to support the requirement for up to 70% axial flaws. Metricated.
(3) At least 50% of the cracks shall be coincident with areas described in (c) above.	(b) At least 50% of the flaws shall be coincident with areas described in 2.1(d) above.	Renumbered. Due to inclusion of "alternative flaws," use of "cracks" is no longer appropriate.

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
	2.4 Flaw Depth. All flaw depths shall be greater than 10% of the nominal pipe wall thickness. Flaw depths shall exceed the nominal clad thickness when placed in cladding. Flaws in the sample set shall be distributed as follows: Flaw Depth (% Wall Thickness) — Minimum Number of Flaws 10-30% — 20% 31-60% — 20% 61-100% — 20% At least 75% of the flaws shall be in the range of 10 to 60% of wall thickness.	Moved from old paragraph 1.3(c) and 1.4 and re-titled. Consistency between detection and sizing specimen set requirements (e.g., 20% vs. 1/3 flaw depth increments, e.g., original paragraph 1.3(c)).
1.2 Detection Specimens. The specimen set shall include detection specimens that meet the following requirements.		Renumbered and re-titled and moved to paragraph 3.1(a). No other changes.

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
(a) Specimens shall be divided into grading units. Each grading unit shall include at least 3 inch of weld length. If a grading unit is designed to be unflawed, at least 1 inch of unflawed material shall exist on either side of the grading unit. The segment of weld length used in one grading unit shall not be used in another grading unit. Grading units need not be uniformly spaced around the pipe specimen.		Renumbered to paragraph 3.1(a)(1). No other changes.
(b) Detection sets shall be selected from Table VIII-S2-1. The number of unflawed grading units shall be at least twice the number of flawed grading units.		Moved to new paragraph 3.1(a)(2).
(c) Flawed grading units shall meet the following criteria for flaw depth, orientation, and type.		Flaw depth requirements moved to new paragraph 2.4, flaw orientation requirements moved to new paragraph 2.5, flaw type requirements moved to new paragraph 2.3, "Flaw Type."

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
(1) All flaw depths shall be greater than 10% of the nominal pipe wall thickness. At least 1/3 of the flaws, rounded to the next higher whole number, shall have depths between 10% and 30% of the nominal pipe wall thickness. However, flaw depths shall exceed the nominal clad thickness when placed in cladding. At least 1/3 of the flaws, rounded to the next whole number, shall have depths greater than 30% of the nominal pipe wall thickness.		Deleted, for consistency in sample sets the depth distribution is the same for detection and sizing.
(2) At least 30% and no more than 70% of the flaws, rounded to the next higher whole number, shall be oriented axially. The remainder of the flaws shall be oriented circumferentially.	**2.5 Flaw Orientation.** (a) For other than sizing specimens, at least 30% and no more than 70% of the flaws, rounded to the next higher whole number, shall be oriented axially. The remainder of the flaws shall be oriented circumferentially.	Note, this distribution is applicable for detection and depth sizing. Paragraph 2.5(b)(1) requires that all length-sizing flaws be oriented circumferentially.
1.3 Length Sizing Specimens. The specimen set shall include length sizing specimens that meet the following requirements.		Renumbered and re-titled and moved to new paragraph 3.2.
(a) All length sizing flaws shall be oriented circumferentially.		Moved, included in new paragraph 3.2(a).

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
(b) The minimum number of flaws shall be ten.		Moved, included in new paragraph 2.1 above.
(c) All flaw depths shall be greater than 10% of the nominal pipe wall thickness. At least 1/3 of the flaws, rounded to the next higher whole number, shall have depths between 10% and 30% of the nominal pipe wall thickness. However, flaw depth shall exceed the nominal clad thickness when placed in cladding. At least 1/3 of the flaws, rounded to the next whole number, shall have depths greater than 30% of the nominal pipe wall thickness.		Moved, included in new paragraph 2.4 above after revision for consistency with detection distribution.
1.4 Depth Sizing Specimens. The specimen set shall include depth sizing specimens that meet the following requirements.		Moved, included in new paragraphs 2.1, 2.3, 2.4.
(a) The minimum number of flaws shall be ten.		Moved, included in new paragraph 2.1.
(b) Flaws in the sample set shall not be wholly contained within cladding and shall be distributed as follows:		Moved, potential conflict with old paragraph 1.2(c)(1); "However, flaw depths shall exceed the nominal clad thickness when placed in cladding." Revised for clarity and included in new paragraph 2.4.

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
Flaw Depth (% Wall Thickness) / Minimum Number of Flaws 10-30% 20% 31-60% 20% 61-100% 20% The remaining flaws shall be in any of the above categories.		Moved, included in paragraph 2.4 for consistent applicability to detection and sizing samples.
	(b) Sizing Specimen sets shall meet the following requirements.	Added for clarity.
	(1) Length-sizing flaws shall be oriented circumferentially.	Moved from old paragraph 1.3(a).
	(2) Depth sizing flaws shall be oriented as in 2.5(a).	Included for clarity. Previously addressed by omission (i.e., length, but not depth had a specific exclusionary statement).
2.0 CONDUCT OF PERFORMANCE DEMONSTRATION	**3.0 CONDUCT OF PERFORMANCE DEMONSTRATION**	Renumbered.

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
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 candidate viewing of unmasked specimens after the performance demonstration is prohibited.	Personnel and procedure performance demonstration tests shall be conducted according to the following requirements: (a) For qualifications from the outside surface, the specimen inside surface and identification shall be concealed from the candidate. When qualifications are performed from the inside surface, the flaw location and specimen identification shall be obscured to maintain a "blind test." All examinations shall be completed prior to grading the results and presenting the results to the candidate. Divulgence of particular specimen results or candidate viewing of unmasked specimens after the performance demonstration is prohibited.	Differentiate between qualifications conducted from the outside and inside surface.
2.1 Detection Test. Flawed and unflawed grading units shall be randomly mixed	**3.1 Detection Qualification.**	Renumbered, moved text to paragraph 3.1(a)(3).
	(a) The specimen set shall include detection specimens that meet the following requirements.	Renumbered, moved from old paragraph 1.2.

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
	(1) Specimens shall be divided into grading units. (a) Each grading unit shall include at least 3 inch (76 mm) of weld length. (b) The end of each flaw shall be separated from an unflawed grading unit by at least 1 inch (25 mm) of unflawed material. A flaw may be less than 3 inch in length (c) The segment of weld length used in one grading unit shall not be used in another grading unit. (d) Grading units need not be uniformly spaced around the pipe specimen.	Renumbered, moved from old paragraph 1.2(a). Metricated. No other changes.
	(2) Personnel performance demonstration detection test sets shall be selected from Table VIII-S10-1. The number of unflawed grading units shall be at least 1-1/2 times the number of flawed grading units.	Moved from old paragraph 1.2(b). Table revised to reflect a change in the minimum sample set to 10 and the application of equivalent statistical false call parameters to the reduction in unflawed grading units. Human factors due to large sample size.
	(3) flawed and unflawed grading units shall be randomly mixed.	Moved from old paragraph 2.1.

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
	(b) Examination equipment and personnel are qualified for detection when personnel demonstrations satisfy the acceptance criteria of Table VIII-S10-1 for both detection and false calls.	Moved from old paragraph 3.1. Modified to reflect the 100% detection acceptance criteria of procedures versus personnel and equipment contained in new paragraph 4.0 and the use of 1.5X rather than 2X unflawed grading units contained in new paragraph 3.1(a)(2). Note, the modified table maintains the screening criteria of the original Table VIII-S2-1.
2.2 Length Sizing Test	**3.2 Length Sizing Test**	Renumbered.
(a) The length sizing test may be conducted separately or in conjunction with the detection test.	(a) Each reported circumferential flaw in the detection test shall be length sized.	Provides consistency between Supplement 10 and the recent revision to Supplement 2 (Reference BC 00-755).
(b) When the length sizing test is conducted in conjunction with the detection test, and less than ten circumferential flaws are detected, additional specimens shall be provided to the candidate such that at least ten flaws are sized. 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.	(b) When the length sizing test is conducted in conjunction with the detection test, and less than ten circumferential flaws are detected, additional specimens shall be provided to the candidate such that at least ten flaws are sized. The regions containing a flaw to be sized may be identified to the candidate. The candidate shall determine the length of the flaw in each region.	Change made to ensure security of samples, consistent with the recent revision to Supplement 2 (Reference BC 00-755). Note: length and depth sizing use the term "regions" while detection uses the term "grading units." The two terms define different concepts and are not intended to be equal or interchangeable.

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
(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.	(c) For a separate length sizing test, the regions of each specimen containing a flaw to be sized may be identified to the candidate. The candidate shall determine the length of the flaw in each region.	Change made to ensure security of samples, consistent with the recent revision to Supplement 2 (Reference BC 00-755).
	(d) Examination procedures, equipment, and personnel are qualified for length sizing when the RMS error of the flaw length measurements, as compared to the true flaw lengths, do not exceed 0.75 inch (19 mm).	Moved from old paragraph 3.2(a). Includes inclusion of "when" as an editorial change. Metricated.
2.3 Depth Sizing Test	**3.3 Depth Sizing Test**	Renumbered.
(a) 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.	(a) The depth sizing test may be conducted separately or in conjunction with the detection test. For a separate depth sizing test, the regions of each specimen containing a flaw to be sized may be identified to the candidate. The candidate shall determine the maximum depth of the flaw in each region.	Change made to ensure security of samples, consistent with the recent revision to Supplement 2 (Reference BC 00-755).

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
(b) 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 maximum depth of the flaw in each region.	(b) When the depth sizing test is conducted in conjunction with the detection test, and less than ten flaws are detected, additional specimens shall be provided to the candidate such that at least ten flaws are sized. The regions of each specimen containing a flaw to be sized may be identified to the candidate. The candidate shall determine the maximum depth of the flaw in each region.	Change made to be consistent with the recent revision to Supplement 2 (Reference BC 00-755). Changes made to ensure security of samples, consistent with the recent revision to Supplement 2 (Reference BC 00-755).
	(c) Examination procedures, equipment, and personnel are qualified for depth sizing when the RMS error of the flaw depth measurements, as compared to the true flaw depths, do not exceed 0.125 inch (3 mm).	Moved from old paragraph 3.2(b). Metricated.
3.0 ACCEPTANCE CRITERIA		Delete as a separate category. Moved to new paragraph detection (3.1) and sizing 3.2 and 3.3.
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.		Moved to new paragraph 3.1(b), reference changed to Table S10 from S2 because of the change in the minimum number of flaws and the reduction in unflawed grading units from 2X to 1.5X.

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
3.2 Sizing Acceptance Criteria.		Deleted as a separate category. Moved to new paragraph on length 3.2 and depth 3.3.
(a) Examination procedures, equipment, and personnel are qualified for length sizing when the RMS error of the flaw length measurements, as compared to the true flaw lengths, is less than or equal to 0.75 inch.		Moved to new paragraph 3.2(d), included word "when" as an editorial change.
(b) Examination procedures, equipment, and personnel are qualified for depth sizing when the RMS error of the flaw depth measurements, as compared to the true flaw depths, is less than or equal to 0.125 inch		Moved to new paragraph 3.3(c).

SUPPLEMENT 10 – QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
	4.0 PROCEDURE QUALIFICATION	New.
	Procedure qualifications shall include the following additional requirements. (a) The specimen set shall include the equivalent of at least three personnel performance demonstration test sets. Successful personnel performance demonstrations may be combined to satisfy these requirements. (b) Detectability of all flaws in the procedure qualification test set that are within the scope of the procedure shall be demonstrated. Length and depth sizing shall meet the requirements of paragraph 3.1, 3.2, and 3.3. (c) At least one successful personnel demonstration shall be performed. (d) To qualify new values of essential variables, at least one personnel qualification set is required. The acceptance criteria of 4.0(b) shall be met.	New. Based on experience gained in conducting qualifications, the equivalent of three personnel sets (i.e., a minimum of 30 flaws) is required to provide enough flaws to adequately test the capabilities of the procedure. Combining successful demonstrations allows a variety of examiners to be used to qualify the procedure. Detectability of each flaw within the scope of the procedure is required to ensure an acceptable personnel pass rate. The last sentence is equivalent to the previous requirements and is satisfactory for expanding the essential variables of a previously qualified procedure.

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TABLE VIII-SZ-1
PERFORMANCE DEMONSTRATION DETECTION TEST ACCEPTANCE CRITERIA

Detection Test Acceptance Critera		False Call Test Acceptance Criteria	
No. of Flawed Grading Units	Minimum Detection Criteria	No. of Unflawed Grading Units	Maximum Number of False Calls
~~5~~	~~5~~	~~10~~	~~0~~
~~6~~	~~6~~	~~12~~	~~1~~
~~7~~	~~6~~	~~14~~	~~1~~
~~8~~	~~7~~	~~16~~	~~2~~
~~9~~	~~7~~	~~18~~	~~2~~
10	8	~~20~~ 15	~~3~~ 2
11	9	~~22~~ 17	~~3~~ 3
12	9	~~24~~ 18	~~3~~ 3
13	10	~~26~~ 20	~~4~~ 3
14	10	~~28~~ 21	~~5~~ 3
15	11	~~30~~ 23	~~5~~ 3
16	12	~~32~~ 24	~~6~~ 4
17	12	~~34~~ 26	~~6~~ 4
18	13	~~36~~ 27	~~7~~ 4
19	13	~~38~~ 29	~~7~~ 4
20	14	~~40~~ 30	~~8~~ 5