Stephen A. Byrne
Senior Vice President, Nuclear Operations
803.345.4622

SCE&G®
A SCANA COMPANY

July 11, 2003

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS)
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
REQUEST TO USE ALTERNATIVES TO ASME BOILER AND PRESSURE VESSEL CODE, SECTION XI
RR-II-15, RR-II-16, RR-II-17, RR-II-18, RR-II-19, RR-II-20, RR-II-21

South Carolina Electric and Gas Company (SCE&G) hereby submits the seven attached requests for using alternatives to the examination requirements of ASME Code, Section XI. SCE&G has determined that the proposed alternatives will provide an acceptable level of quality and safety.

Detailed descriptions of these proposed alternatives, including bases for relief, are included as attachments to this letter. SCE&G requests NRC review and approval of this request by October 1, 2003, so that appropriate changes to the VCSNS Examination Program can be completed to support implementation during refueling outage 14 (RF14), currently scheduled for October 2003.

SCE&G is submitting the attached relief requests in accordance with 10CFR50.55a(a)(3)(i).

Should you have any questions, please call Mr. Ron Clary at (803) 345-4757.

Very truly yours,

Stephen A. Byrne

JWT/SAB/dr
Attachments (7)

A047

c: N. O. Lorick
N. S. Carns
T. G. Eppink (w/o Attachments)
R. J. White
L. A. Reyes
K. R. Cotton
K. M. Sutton
A. R. Caban
NRC Resident Inspector
NSRC
RTS (0-C-03-0262)
File (810.19-2)
DMS (RC-03-0142)

South Carolina Electric & Gas Co. (SCE&G)
Virgil C. Summer Nuclear Station (VCSNS)
Relief Request

RR-II-15

Subject:

This relief request provides alternate requirements for the Reactor Vessel Flange to Shell Weld examination required by Subsection IWA of ASME Code, Section XI, 1989 Edition (henceforth Section XI).

Components:

ASME Code Class 1 Reactor Vessel Flange to Upper Shell Weld.

Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1989 Edition with No Addenda: Subsection IWA-2232 requires UT examination of the RPV to flange weld in accordance with ASME Code Section V, Article 4. Regulatory Guide 1.150, Rev. 1, augments these requirements.

Relief Request:

SCE&G proposes to use an Appendix VIII qualified shell weld procedure for the remote mechanized ultrasonic examination of the reactor vessel flange to shell weld from the vessel ID surface in lieu of ASME Section V Article 4.

Alternate Test:

In accordance with 10CFR50.55a(a)(3)(i), SCE&G proposes to use a qualified performance based procedure for the ultrasonic examination of the reactor vessel flange to upper shell weld similar to that used for reactor vessel shell welds of similar thickness and material composition.

Basis for Relief:

This relief is requested to allow using an Appendix VIII qualified procedure for the remote mechanized examination of the reactor vessel flange to shell weld in accordance with ASME Section XI, Division 1, 1995 Edition, 1996 Addenda, Supplements 4 and 6, as modified by 64 FR 51370 through 51400 dated September 22, 1999, in lieu of ASME Section V Article 4. Utilizing a remote mechanized examination system will greatly reduce the personnel radiation exposure typically received during the manual performance of this activity.

Although Appendix VIII is not required for this weld, using an examination procedure qualified in accordance with Appendix VIII will provide an increased margin of safety and surpass the quality of the generic examination techniques specified by the referencing Code Edition.

Compliance with these Requirements will assure the requisite level of Quality is maintained.

The September 22, 1999, revision of 10 CFR 50.55(a) required implementation of ASME Section XI, Appendix VIII, Supplements 4 (clad-base metal interface) and Supplement 6 (vessel welds other than clad-base metal interface). Reactor vessel shell welds are subject to examination in accordance with these supplements, however, the flange to shell weld is the only reactor vessel shell weld not included in Appendix VIII.

For the VCSNS reactor vessel examination planned for 2003, SCE&G will be employing procedures and equipment qualified by performance demonstration in accordance with ASME Section XI, 1995 Edition, 1996 Addenda as amended by 10CFR50.55(a) October 2000 and WesDyne International "Vendors Technical Basis for Single Side Examinations of Ferritic RPV Welds", February 2001.

The Appendix VIII procedure is technically superior to the standard ASME Code, Section V, Article 4 methodologies that are amplitude based. Enhanced performance is possible by (a) increased sensitivity to flaws, (b) demonstrated flaw measurement capability using amplitude independent sizing techniques, and (c) compatibility of the Appendix VIII examination technique with the VCSNS flange to shell weld joint geometry resulting in good ultrasonic beam coverage. An additional benefit is reduction in radiation exposure to the exam team and VCSNS support personnel. This is possible because different examination devices will not have to be installed on the robot just to perform the flange to shell weld exam.

(a) Increased Sensitivity to Flaws: The Appendix VIII procedure is more sensitive to flaws because the exam sensitivity level compares to the ASME DAC level of 5-10 percent DAC. This is the highest practical sensitivity for ultrasonic testing. Previous examinations on the reactor vessel shell welds in accordance with ASME Section V were conducted at the less sensitive level of 50 percent DAC for flaws resident in the outer 80 percent of the material thickness and 20 percent DAC for flaws resident from the clad-base metal interface to a depth of about 20 percent thickness.

    The Appendix VIII procedure offers an additional level of assurance in the detection of flaws because the procedure requires that all signals interpreted by the analyst as flaws regardless of response amplitude shall be measured and assessed in accordance with the applicable criteria. The Appendix VIII procedure recognizes that some flaws can exhibit low amplitude response depending on orientation. This evidence has not been factored into the

ASME Section V techniques that have traditionally had a flaw response cut-off point of 20 percent DAC.

(b) Demonstrated Flaw Measurement Capability Using Amplitude Independent Sizing Techniques: Westinghouse Procedure PDI-ISI-254 "Remote Inservice Examination of Reactor Vessel Shell Welds," in accordance with ASME Section XI, Appendix VIII, Supplements 4 and 6 was demonstrated in 2001 to the Performance Demonstration Initiative (PDI) at EPRI. (PDQS No. 407).

The procedure complies with ASME Code, Section XI 1995 Edition, 1996 Addenda as modified by the final rule. The procedure was qualified using amplitude independent sizing techniques such as tip diffraction measurement and sizing by measurement of the flaw secondary response signals (a proven method for volumetric-type defects). The amplitude based flaw bounding criteria specified in ASME Section V procedures has been proven inaccurate as the size of the reflection is measured which may or may not accurately reflect true flaw size.

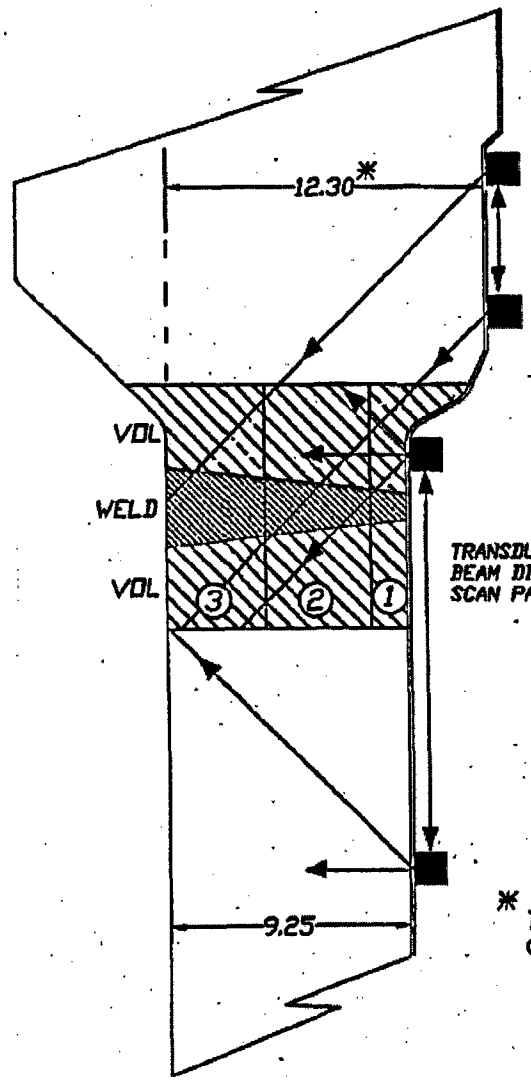
(c) Compatibility of the Appendix VIII Technique to the VCSNS Flange to Shell Weld Joint and Synergy with the Previous Examination. The Appendix VIII shell weld examination procedure requires the use of one beam angle, 45 degrees, applied to the weld and volume using 3 different transducer types each covering a specified depth range. The procedure requires the exam volume to be crosshatched with sound beams in four orthogonal directions. The increment size is 0.5 inch. Coverage is estimated in the attached sketch. From the sketch, the critical inner 15 percent is well interrogated with the exception of area directly beneath the curved surface above the weld. This is a common limitation for the flange to shell weld joint.

The last remote mechanized exam of the flange to shell weld was conducted in 1993. At that time 45, 60 and 70 degree exam angles were used, and the results were acquired and analyzed using an automated ultrasonic exam system. The increment size was 0.5 inch, and the exam method was contact. Results from the exam were that no indications were found exceeding the allowable limits of Section XI. There is excellent data archival from the 1993 exam, and SCE&G is confident that reasonable comparisons can be made with the Appendix VIII examination if any questions arise concerning indications.

SCE&G will ensure that the flange to shell weld of the VCSNS reactor vessel will be examined with proven qualified ultrasonic examination techniques in lieu of standard amplitude based ultrasonic examination techniques currently specified. Examinations will be conducted to the maximum extent practical in four orthogonal directions. The examination sensitivity and flaw measurement capability of the proposed alternative are superior to the method prescribed and coverage will be good considering the difficult geometric presentation.

Implementation Schedule:

This relief will be implemented during the current second interval at VCSNS as required by ASME Code, Section XI, 1989 Edition. Implementation period will be from October 1, 2003 to December 31, 2003.



TRANSDUCER POSITIONS, BEAM DIRECTIONS AND SCAN PATH

V.C SUMMER UNIT 1 REACTOR VESSEL FLANGE TO UPPER SHELL WELD

PREDICTED
% COVERAGE USING APPENDIX VIII
PROCEDURE PDI-ISI-254

	UP		DN		CW/CCW	
	WELD	VOL	WELD	VOL	WELD	VOL
ZONE ①	100	65	95	55	100	55
ZONE ②	100	90	10	25	100	55
ZONE ③	100	100	80	50	100	50

* THE APPENDIX VIII TECHNIQUE IS QUALIFIED TO A DEPTH OF 12.3 INCHES (REF: WESDYNE PROCEDURE PDI-ISI-254 REVISION 5).

South Carolina Electric & Gas Co. (SCE&G)
Virgil C. Summer Nuclear Station (VCSNS)
Relief Request

RR-II-16

Subject:

This relief request provides alternate requirements for the Reactor Vessel to Shell Weld examination required by Subsection IWA of ASME Code, Section XI, 1989 Edition (henceforth Section XI).

Components:

ASME Code Class 1 Reactor Vessel Nozzle to Shell Welds.

Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1989 Edition with No Addenda: Table IWB-2500-1 Code Item B3.90, Figures IWB-2500-7 (a) and (b) for defining the examination volume of the VCSNS reactor vessel nozzle to shell welds. The examination requirements for reactor vessel nozzle to shell welds are defined in the ASME Code, Section XI, Appendix VIII, Supplements 4, 6 and 7, 1995 Edition, 1996 Addenda as modified by 10 CFR 50.55a. Six (6) RPV nozzle to shell welds, 3 inlet and 3 outlet, are planned for examination in 2003 as follows:

Weld CGE-1-1100A-18 at 25 degree vessel azimuth
Weld CGE-1-1100A-19 at 95 degree vessel azimuth
Weld CGE-1-1100A-20 at 145 degree vessel azimuth
Weld CGE-1-1100A-21 at 215 degree vessel azimuth
Weld CGE-1-1100A-22 at 265 degree vessel azimuth
Weld CGE-1-1100A-23 at 325 degree vessel azimuth

Relief Request:

SCE&G requests relief from the ts/2 examination volume requirements of ASME Section XI, Figures IWB-2500-7 (a) and (b).

Alternate Test:

In accordance with 10CFR50.55a(a)(3)(i), SCE&G proposes relief from the ts/2 examination volume and instead proposes examination of the base material volume extending 1/2 inch from

each side of the weld. This refined examination volume is defined in detail within Code Case N-613-1.

Basis for Relief:

The examination volume for the RPV nozzle to vessel welds are unnecessarily large. For the VCSNS reactor vessel, the nozzle to shell volume would extend about 5 inches into the nozzle forging and the same distance into the upper shell course forging. This proposed alternative would re-define the examination volume boundary to ½ inch of base metal on each side of the thickest portion of the weld. This reduction in base metal inspection will not affect the flaw detection capabilities in the weld and heat affected zone.

Compliance with these requirements will assure the requisite level of quality and safety is maintained.

The proposed reduction in exam volume is base metal only, extensively interrogated by ultrasonic examination during fabrication, preservice examinations and inservice examinations performed in 1993. In 1993, the data was acquired, archived and analyzed using automated ultrasonic systems, and SCE&G is confident that reasonable comparisons can be made between the past and present if necessary. During previous examinations, no indications exceeding the allowable limits of the preservice and inservice criteria were found in the six-reactor vessel nozzle to shell examination volumes including the base metal areas proposed for exclusion from examination in this request. The 1993 results were based on examinations performed in accordance with the ASME Code, Section XI, Section V and Regulatory Guide 1.150, Rev. 1.

The Section XI examination volume for the pressure-retaining nozzle to shell welds extends from the edge of the weld to include a significant portion of the nozzle forging body (inward) and reactor vessel upper shell course (outward) which is a forged ring. The large volume results in a significant increase in examination time with no corresponding increase in safety as the greatest portion of the volume is base material not prone to inservice cracking.

The implementation of this request for relief would reduce the examination volume next to the widest portion of the weld from half the vessel wall thickness to 1/2 inch from the weld. This reduction applies only to base metal and not the stressed areas of the nozzle to shell weld.

SCE&G shall ensure that the high stressed areas of the VCSNS reactor vessel nozzle to shell welds shall be included in the examination. The examinations shall consist of techniques and procedures qualified in accordance with the ASME Code, Section XI, Appendix VIII, and supplements 4, 6 and 7. The weld and surrounding ½ inch volume will be interrogated from the nozzle bore using techniques and procedures specifically qualified to inspect the nozzle to shell

weld from the nozzle bore. These procedures were qualified in January 2003 in accordance with Appendix VIII, Supplement 7 as administered by the PDI.

The nozzle to shell examination volume is also accessible from the vessel ID surface and will be examined in four orthogonal directions for the first 15 percent of weld thickness with respect to the vessel ID surface using Appendix VIII, Supplement 4 qualified techniques. The remaining 85 percent of weld volume accessible from the vessel ID surface will be examined in two opposing circumferential scanning directions using Appendix VIII, Supplement 6 qualified techniques to interrogate for transverse defects.

This combination of scans addresses the requirements set forth by the ASME Code, Section XI, 1995 Edition with 1996 Addenda as modified by 10CFR50.55a and assures that current qualified technology will be applied to the re-defined examination volume specified herein to the maximum extent practical. Compliance with these requirements will assure the requisite level of quality and safety is maintained.

Implementation Schedule:

This relief will be implemented during the current second interval at VCSNS as required by ASME Code, Section XI, 1989 Edition. Implementation period will be from October 1, 2003 to December 31, 2003.

South Carolina Electric & Gas Co. (SCE&G)
Virgil C. Summer Nuclear Station (VCSNS)
Relief Request

RR-II-17

Subject:

This relief request provides alternate requirements for the Reactor Vessel Primary Nozzle Inner Radii examination required by Subsection IWB of ASME Code, Section XI, 1989 Edition (henceforth Section XI).

Components:

ASME Code Class 1 Reactor Vessel Primary Nozzle Inner Radii.

Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1989 Edition with No Addenda: Table IWB-2500-1, Item No. B3.20 specifies volumetric examination for reactor vessel nozzle inside radius section. The boundary of the examination volume is depicted in Figure IWB-2500-7(a). Six RPV nozzle inner radius examinations, three inlet and three outlet, are planned for examination in 2003 as follows:

IR CGE-1-1100A-18IR at 25 degree vessel azimuth
IR CGE-1-1100A-19IR at 95 degree vessel azimuth
IR CGE-1-1100A-20IR at 145 degree vessel azimuth
IR CGE-1-1100A-21IR at 215 degree vessel azimuth
IR CGE-1-1100A-22IR at 265 degree vessel azimuth
IR CGE-1-1100A-23IR at 325 degree vessel azimuth

Relief Request:

Relief is requested from the Code required volumetric examination.

Alternate Test:

In accordance with 10CFR50.55a(a)(3)(i), SCE&G proposes relief from the ts/2 examination volume and instead proposes examination of the base material volume extending 1/2 inch from each side of the weld. This refined examination volume is defined in detail within Code Case N-613-1.

Basis for Relief:

In accordance with 10CFR50.55a(a)(3)(i), SCE&G proposes to use a remote grade VT-1 examination, enhanced by procedural requirements for resolution of a 0.001 inch diameter wire as a basis for sensitivity. The video equipment will be capable of an 8X magnification. The Code defined examination volume will be examined 100 percent in all six primary nozzles in the VCSNS reactor vessel. The examination will be archived on high-grade videotape.

This relief is requested to allow the use of an alternative methodology for the examination of the VCSNS reactor pressure vessel primary nozzle inner radius. This proposed alternative is consistent with SCE&G, vendor and regulatory objectives in implementing a comparatively sensitive replacement for a volumetric examination requirement. In addition to technical equivalency, this alternative method has merit in the reduction of time and radiation exposure.

SCE&G believes that reliable ultrasonic examinations of the inner radius volume have been performed from inside the reactor vessel at VCSNS with advanced robotic equipment and ultrasonic exam procedures. No prior indications have been reported at VCSNS or in any PWR inner radii examinations in the last 10 years.

A review of records at VCSNS revealed no ultrasonic indications reported in the preservice exam in 1980 and the first interval inservice examination in 1993. The 1993 volumetric examination was conducted in accordance with ASME Section XI as augmented by RG 1.150. Automated ultrasonic equipment was used for the acquisition and data analyzed by qualified level III personnel. Examination sensitivity was established using 0.125 inch diameter side drilled holes at depths representing the inner radius exam volume depth. Transducers were industry standard dual element shallow angle longitudinal wave units directing the sound clockwise and counterclockwise around the nozzle openings. Transducers were delivered to the surface using an advanced compliant surface-tracking robot.

The substitution of ultrasonic examinations with remote visual examinations for the RV inner radii was first proposed in 1999 and subsequently three meetings were held between SCE&G/vendor representatives and NRC personnel. At the conclusion of those meetings, there was a consensus that visual examination capabilities presented a viable alternative to the volumetric method, particularly in the PWR vessels with no history of indications and generous space available for remote visual examination equipment after removal of the core barrel. SCE&G has confidence that RPV nozzle degradation in the form of hairline surface cracking can be detected by the enhanced visual exam approach proposed and that the proposed alternative will result in an acceptable level of quality and safety.

Implementation Schedule:

This relief will be implemented during the current second interval at VCSNS as required by ASME Code, Section XI, 1989 Edition. Implementation period will be from October 1, 2003 to December 31, 2003.

South Carolina Electric & Gas Co. (SCE&G)
Virgil C. Summer Nuclear Station (VCSNS)
Relief Request

RR-II-18

Subject:

This relief request provides alternate requirements for the Reactor Vessel Lower Head Circumferential Weld examination required by Subsection IWA of ASME Code, Section XI, 1989 Edition (henceforth Section XI).

Components:

ASME Code Class 1 Reactor Vessel Lower Head Circumferential Weld.

Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1989 Edition with No Addenda: Table IWB-2500-1, Item No. B1.21 specifies volumetric examination for circumferential head welds 100 percent of the accessible length. Examination volume is defined in figure IWB-2500-3. This relief request will affect the listed weld and is planned for examination in the fall of 2003:

Weld CGE-1-1100B-5

Relief Request:

Relief is requested from the essential 100 percent volumetric examination coverage.

Alternate Test:

In accordance with 10CFR50.55a(a)(3)(i), SCE&G proposes to examine the lower head circumferential weld to the maximum extent practical using advanced robotics for contact examination. Complete ultrasonic interrogation is anticipated to be 88 percent of the weld length. The normal scanning path of the transducer package is obstructed and partially obstructed by the outermost grouping of lower head penetrations.

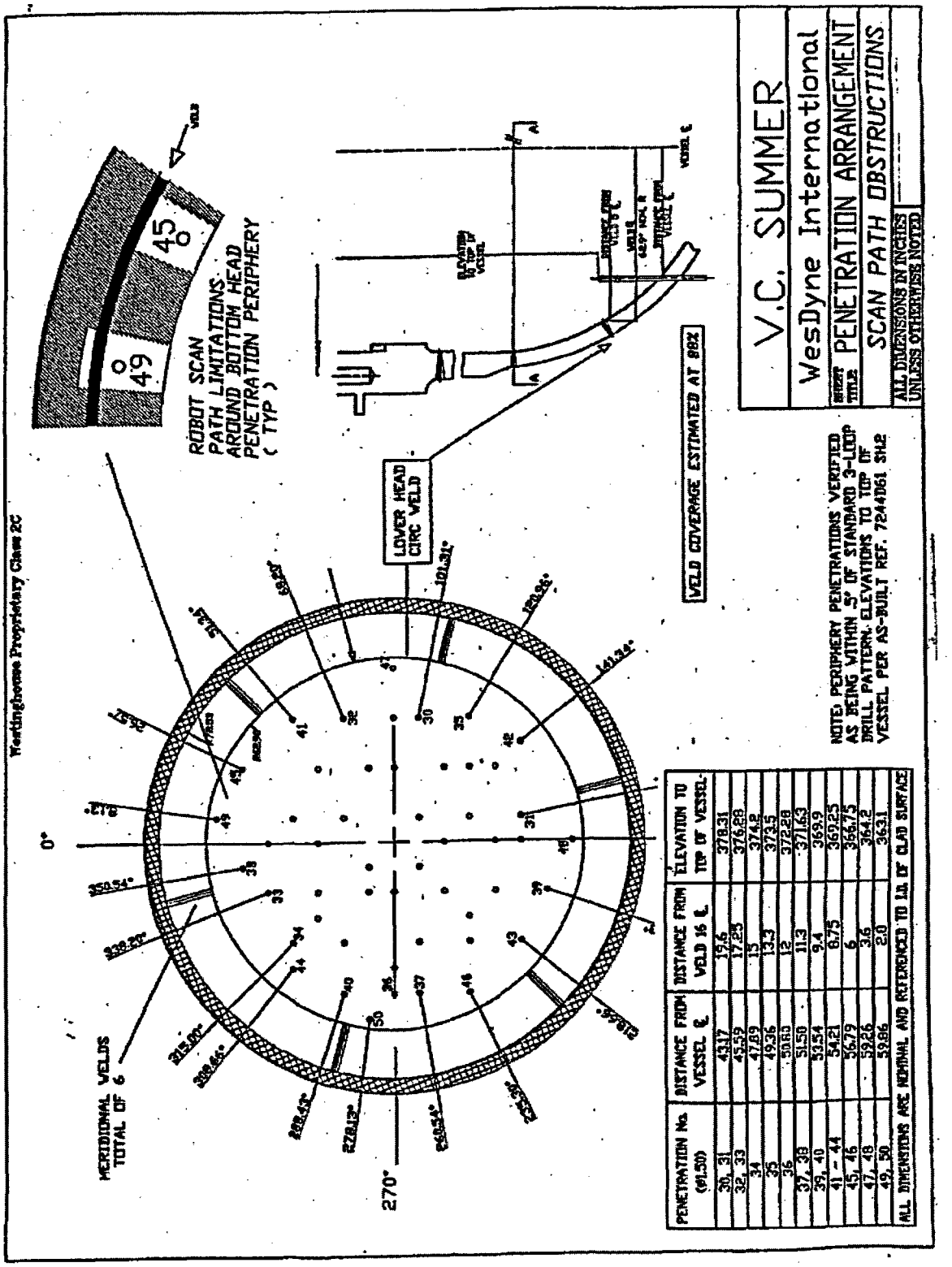
Basis for Relief:

This relief is requested to allow examination coverage to the maximum extent practical in consideration of component geometry.

Ultrasonic examinations of the VCSNS reactor vessel lower head circumferential weld can be accomplished for approximately 88 percent of the length of the weld. A small portion of the weld length cannot be examined due to obstructions from the periphery of the lower head penetrations. An engineering sketch is provided for approximate weld coverage and penetration orientation. The proposed examination will provide an acceptable level of quality and safety.

Implementation Schedule:

This relief will be implemented during the current second interval at VCSNS as required by ASME Code, Section XI, 1989 Edition. Implementation period will be from October 1, 2003 to December 31, 2003.



PENETRATION No. (#1,50)	DISTANCE FROM VESSEL ℄	DISTANCE FROM VELD 16 ℄	ELEVATION TO TOP OF VESSEL
30, 31	43.17	19.6	378.31
32, 33	45.59	17.25	376.88
34	47.89	15	374.2
35	49.36	13.3	373.5
36	50.63	12	372.28
37, 38	51.50	11.3	371.63
39, 40	53.54	9.4	369.9
41 - 44	54.21	8.75	369.25
45, 46	56.79	6	366.75
47, 48	59.26	3.6	364.2
49, 50	59.86	2.0	363.1

ALL DIMENSIONS ARE NOMINAL AND REFERENCED TO I.D. OF CLAD SURFACE

South Carolina Electric & Gas Co. (SCE&G)
Virgil C. Summer Nuclear Station (VCSNS)
Relief Request

RR-II-19

Subject:

This relief request provides alternate requirements for the Reactor Vessel Shell and Head Weld examination required by Subsection IWA of ASME Code, Section XI, 1989 Edition (henceforth Section XI).

Components:

ASME Code Class 1 Reactor Vessel Shell and Head Welds.

Code Requirement:

10CFR50.55a(b)(2) was amended to reference Section XI of the Code through the 1995 Edition with the 1996 Addenda. ASME Section XI, 1995 Edition, 1996 Addenda, Appendix VIII, Supplement 4, Subparagraph 3.2(b) requires that flaw lengths estimated by ultrasonics be the true length (-0.250 inch, +1.0 inch). As amended, 10CFR50.55a(b)(2)(xv)(C)(1) requires a depth sizing criteria of .15 RMS to be used in lieu of Subparagraph 3.2(b) to Supplement 4 of Appendix VIII, Section XI, 1996 Addenda of the Code. Subparagraph 3.2(c) contains additional requirements for statistical parameters.

Relief Request:

Relief is requested for the use of alternative length sizing qualification criteria for Examination Category B-A, item no. B1.10, reactor vessel shell welds and B1.20 head welds subject to Appendix VIII, Supplement 4 examination. ASME Section XI, Class 1.

Alternate Test:

In accordance with 10CFR50.55a(a)(3)(i), SCE&G proposes to use a length sizing qualification criteria of 0.75 RMSE (Root Mean Square Error) in lieu of subparagraph 3.2(b), and to use the RMSE calculations of 3.2(a) and 3.2(b) in lieu of the statistical parameters of 3.2(c).

Basis for Relief:

Paragraph 10CFR50.55a(b)(2)(xv)(C)(1) in the rule changed subparagraph 3.2(b) of Supplement 4 to a flaw sizing tolerance of 0.150 inch for length. The PDI, (Performance Demonstration Initiative) uses a length sizing tolerance of 0.75 inch RMS in the administration of Supplement 4 procedure qualifications. The NRC staff acknowledged that paragraph 10CFR50.55a(b)(2)(xv)(C)(1) in the rule was an error and should be 0.75 inch RMS, consistent with the PDI program. In a public meeting on October 11, 2000, at NRC offices in White Flint, MD, the PDI identified the discrepancy between Subparagraph 3.2(c) and the PDI program. The NRC agreed that Paragraph 10CFR5055.a(b)(2)(xv)(C)(1) should have excluded subparagraph 3.2(c) as a requirement.

It is believed that PDI and the NRC agree regarding Appendix VIII, Supplement 4 length sizing criteria. A Code Case reflecting the PDI implementation program was developed and passed by ASME Code as Code Case N-622 "Ultrasonic Examination of RPV and Piping, Bolts and Studs," Section XI, Division 1. The parameters of the Code Case are the basis for the regulatory discussions and this relief.

Implementation Schedule:

This relief will be implemented during the current second interval at VCSNS as required by ASME Code, Section XI, 1989 Edition. Implementation period will be from October 1, 2003 to December 31, 2003.

South Carolina Electric & Gas Co. (SCE&G)
Virgil C. Summer Nuclear Station (VCSNS)
Relief Request

RR-II-20

Subject:

Request for relief for examination of dissimilar metal welds referenced in the ASME Code, Section XI, Appendix VIII, Supplement 10.

Components:

Pressure Retaining Piping Welds subject to examination using procedures, personnel, and equipment qualified to ASME Section XI, Appendix VIII, Supplement 10 criteria.

Code Requirement:

The following paragraphs or statements are from ASME 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 Request:

Relief is requested to use the following alternative requirements for implementation of Appendix VIII, Supplement 10 requirements. The alternate examination as described in the VCSNS request will be implemented through the PDI Program.

A copy of the proposed revision to Supplement 10 is included with this relief request. It identifies the proposed alternatives and allows them to be viewed in context. It also identifies additional clarifications and enhancements for information. It has been submitted to the ASME Code for consideration and as of September 2002 had been approved by the NDE Subcommittee.

Alternate Examination:

In lieu of the requirements of ASME Section XI, 1995 Edition, 1996 Addenda, Appendix VIII, Supplement 10, the proposed alternative shall be used. The proposed alternative is described in the proposed revision to supplement 10 included with this relief request.

Basis for Relief:

Item 1 - The proposed alternative to Paragraph 1.1(b) states:

> "The specimen set shall include the minimum and maximum pipe diameters and thicknesses for which the examination procedure is applicable. Pipe diameters within 1/2 in. (13 mm) of the nominal diameter shall be considered equivalent. Pipe diameters

larger than 24 in. (610 mm) shall be considered to be flat. When a range of thicknesses is to be examined, a thickness tolerance of ±25% is acceptable."

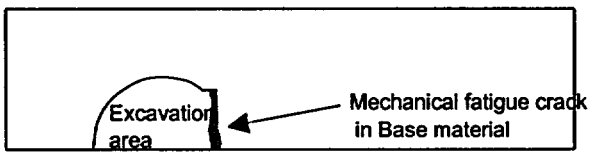
Technical Basis - The change in the minimum pipe diameter tolerance from 0.9 times the diameter to within 1/2 inch of the nominal diameter provides tolerances more in line with industry practice. Though the alternative is less stringent for small pipe diameters they typically have a thinner wall thickness 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 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 flaw mechanisms shall have a tip width no more than 0.002 in. (.05 mm).

Note, 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."

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.



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 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."

Technical Basis - Under the current Code, as few as 25% of the flaws are contained in austenitic weld or buttering material. Recent experience has indicated that flaws contained within the weld are the likely scenarios. 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:

> "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."

Technical Basis - Table S10-1 provides a statistically based ratio between the number of unflawed grading units and the number of flawed grading units. The proposed alternative reduces the ratio to 1.5 times to reduce the number of test samples to a more reasonable number from the human factors perspective. 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 basis 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
10-30%	20%
31-60%	20%
61-100%	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., PWR nozzle to safe end welds) impractical. The proposed alternative differentiates between ID and 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.

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" - the two terms define different concepts and are not intended to be equal or interchangeable). 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.

Items 9 and 10 - The proposed alternative 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. 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:

10

TABLE VIII-S2-1
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

Technical Basis - The proposed alternative is identified as new Table S10-1 above. It was modified to reflect the reduced number of unflawed grading units and allowable false calls. As a part of ongoing Code activities, Pacific Northwest National Laboratories has reviewed the statistical significance of these revisions and offered the revised Table S10-1.

Justification For Granting Relief:

Pursuant to 10 CFR 50.55a(a)(3)(i), approval is requested to use the proposed alternatives described above in lieu of the ASME Section XI, Appendix VIII, Supplement 10 requirements. Compliance with the proposed alternatives will provide an adequate level of quality and safety for examination of the affected welds.

Implementation Schedule:

Implementation period will be from October 1, 2003 to April 30, 2005.

SCE&G requests that this relief be in effect for 18 months for VCSNS. During that time period, SCE&G will closely monitor industry progress for the examination of dissimilar metal welds. If the 0.125" RMS value cannot be achieved, SCE&G will re-apply for relief. It is expected that conclusions regarding capabilities versus criteria in this particular qualification category can be made during that time period.

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 specimen set shall be ten.	New, changed minimum number of flaws to 10 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 in. 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 **1/2 in. (13 mm) of the** nominal diameter shall be considered equivalent. Pipe diameters larger than 24 in. **(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, **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 for inside surface examinations).** **(e) 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, and 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 no more than 0.002 in. (.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 in. of weld length. If a grading unit is designed to be unflawed, at least 1 in. 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.

SUPPLEMENT 10 - QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
(a) All length sizing flaws shall be oriented circumferentially.		Moved, included in new paragraph 3.2(a).
(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 I/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.

SUPPLEMENT 10 - QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
(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.
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).

SUPPLEMENT 10 - QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
2.0 CONDUCT OF PERFORMANCE DEMONSTRATION	**3.0 PERFORMANCE DEMONSTRATION**	Renumbered.
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.

SUPPLEMENT 10 - QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
2.1 Detection Test. Flawed and unflawed grading units shall be randomly mixed	**3.1 Detection Test.**	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.
	(1) Specimens shall be divided into grading units. (a) Each grading unit shall include at least 3 in. **(76 mm)** of weld length. (b)The end of each flaw shall be separated from an unflawed grading unit by at least 1 in. **(25 mm)** of unflawed material. A flaw may be less than 3 in. 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.

SUPPLEMENT 10 - QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
	(3) Flawed and unflawed grading units shall be randomly mixed.	Moved from old paragraph 2.1.
	(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 in. **(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 in. **(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 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 in.		Moved to new paragraph 3.3(c).
	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.**	New. Based on experience gained in conducting qualifications, the equivalent of 3 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.

SUPPLEMENT 10 - QUALIFICATION REQUIREMENTS FOR DISSIMILAR METAL PIPING WELDS		
Current Requirement	**Proposed Change**	**Reasoning**
	(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.**	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.

10

TABLE VIII-S2-1
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

South Carolina Electric & Gas Co. (SCE&G)
Virgil C. Summer Nuclear Station (VCSNS)
Relief Request

RR-II-20-Addenda

Subject:

In addition to the base relief requested, SCE&G requests that this qualification specific relief be allowed for examination of dissimilar metal welds referenced in the ASME Code, Section XI, Appendix VIII, Supplement 10.

South Carolina Electric and Gas has been informed by its inspection vendor that procedures were not capable of being completely qualified to the Appendix VIII, Supplement 10 through-wall RMS sizing value of less than or equal to 0.125" RMS, (Ref. Par 3.2). Additionally, applicable to the VCSNS 1 reactor nozzle to primary piping dissimilar metal field weld, the procedure is fully qualified only for the detection and length sizing of circumferential flaws.

During the qualification process, the ultrasonic examiners concluded that transducer contact could not be maintained in certain areas of the specimen during scanning for axial defects. In the procedure performance summary issued by PDI, a limitation is noted for the detection of axial flaws in Supplement 10 field weld configurations.

Components:

ASME Code Class 1 - Reactor Vessel to Primary Piping Dissimilar Metal Field Welds.

Code Requirement:

Procedures must be qualified to the Appendix VIII, Supplement 10 (Paragraph 3.2), sizing value of less than or equal to 1.25 inches RMS.

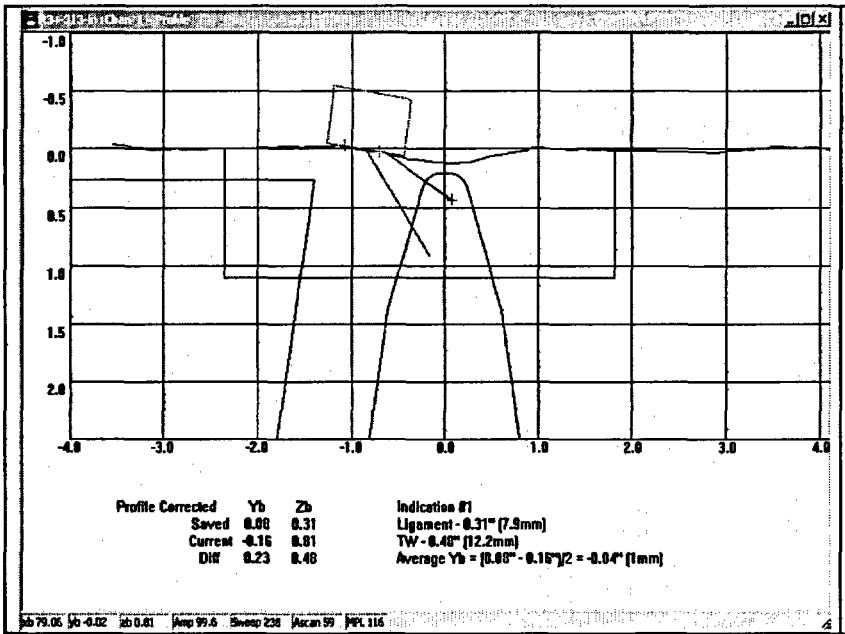
Alternative Approach/Basis for Relief:

The utility's vendor is presently developing improvements to their depth sizing performance. If the vendor's current performance does not meet the ASME Code 0.125" RMS acceptance criteria, the utility will consider the achieved performance of the procedure during evaluations of detected flaws. South Carolina Electric and Gas proposes to evaluate the depth sizing performance of their selected vendor and determine the appropriate sizing error to consider during such flaw evaluations. The difference between the achieved sizing error and the code

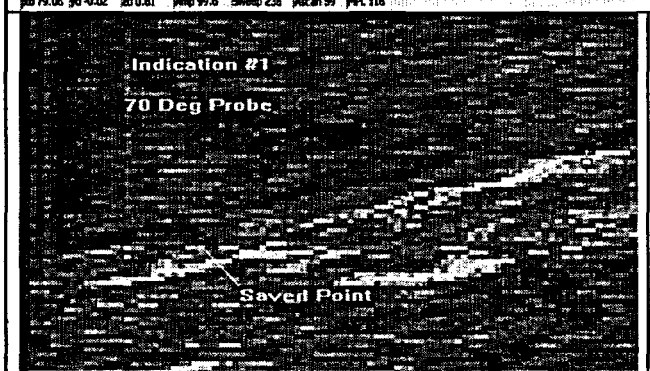
required value of 0.125" RMS would be added to the size of flaws measured during the examination for the purpose of flaw evaluation.

Additionally, as an alternative methodology to address the procedure detection limitation, the utility proposes to use advanced surface geometry profiling software to help the examiner confirm locations where the raw data indicates lack of transducer contact due to problematic surface geometry. Where such areas are identified, the examiner will have the option to use miniature transducers to facilitate detection in those areas.

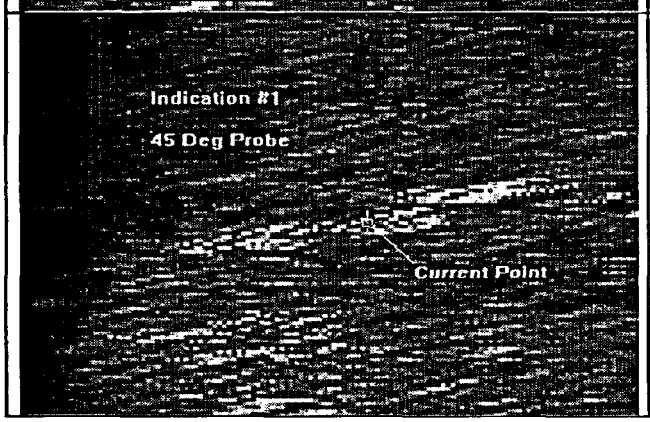
In this technique, a focused immersion transducers is positioned ahead of the transducer bundle on the examination array. This transducer location permits accurate profile data across the exam volume with minimal tilt and jitter from the array. In software this data is translated into a scale representation of the exam surface where specific points in the raw data can be imported as follows:



For Indication #1, the 70° probe data provided the best estimate of the upper planar flaw boundary and the 45° probe data provided the best estimate of the lower planar flaw boundary. Both points are shown in the beam plots in the Profile View and are documented (Yb and Zb positions) in the left table below the plot. The 'Diff' is the arithmetic difference between the 'Saved' and 'Current' coordinates. The 'Saved' Zb point is the ligament to the ID surface. The through-wall depth of the planar flaw is the 'Diff Zb'. The flaw location is the average between the 'Saved' and 'Current' positions.



The 70° probe data shows a target motion line at a depth shallower than the depth with the 45° probe data. Double left clicking on the mouse button with the cursor on the center of the target motion line displays the beam plot in the Profile View corrected for the ID surface contour. This point is then saved on the Profile View. The point is marked on the Profile View by an '+' and the corrected Yb and Zb coordinates are shown in the table below the beam plot as 'Saved'. This point is to be taken as the upper planar flaw boundary.

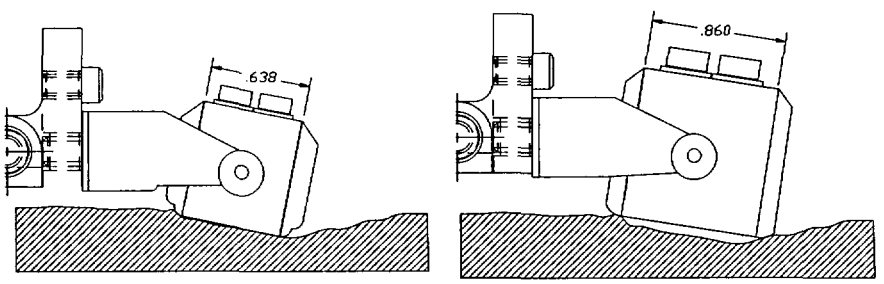


The 45° probe data shows a deeper target motion line indicative of the lower planar flaw boundary. Double left clicking on the mouse button with the cursor on the center of the target motion line displays the beam plot in the Profile View corrected for the ID surface contour. The point is marked as the end of the line emanating from the probe. The corrected Yb and Zb coordinates are shown in the table below the beam plot as 'Current'. This point is taken as the lower planar flaw boundary.

With this data the examiner can adjust flaw bounding dimensions, determine metal ligament if applicable and better judge if limitations apparent in the raw data can be supported by local surface profile data. This last feature is the more important capability of the process as it pertains directly to the anticipated surface geometry of the V.C. Summer primary loop DM welds. Procedures made specific to V.C. Summer Unit 1 will require the following:

1) Regular 22mm x 22mm transducers for detection of circumferential defects. This is the "standard technique" qualified for detection and length sizing. These transducers will also be used initially for axial defect scans.
2) 100% profiling of all nozzle to primary piping DM weld ID surfaces (Hot Leg and Cold Leg).
3) Evaluation of the raw data for transducer contact and profile data for supporting evidence. Areas of insufficient contact will be re-examined with miniature transducers.

The expected differences in transducer performance are illustrated:



.638" sq MINIATURE DETECTION AND SIZING TRANSDUCERS

.86" sq. STANDARD DETECTION AND SIZING TRANSDUCERS.

EXPECTED IMPROVEMENT IN SURFACE CONTACT: CW & CCW SCANS FOR AXIAL FLAWS.

It is the utility position that compensating for the flaw through-wall sizing error band in fracture mechanics evaluation and procedure enhancements designed to facilitate detection will provide an acceptable margin of safety in the in-service examination of V.C Summer reactor vessel nozzle to primary loop dissimilar metal field welds. In addition, the vendor is scheduled to perform additional testing at EPRI in July in an effort to remove any procedure detection limitations and improve through-wall sizing RMS values. The Commission will be notified of any positive change in status as a result of these additional demonstrations.

Implementation Schedule:

Implementation period will be from October 1, 2003 to April 30, 2005.

SCE&G requests that this relief be in effect for 18 months for VCSNS. During that time period, SCE&G will closely monitor industry progress for the examination of dissimilar metal welds. If the 0.125" RMS value cannot be achieved, SCE&G will re-apply for relief. It is expected that conclusions regarding capabilities versus criteria in this particular qualification category can be made during that time period.

South Carolina Electric & Gas Co. (SCE&G)
Virgil C. Summer Nuclear Station (VCSNS)
Relief Request

RR-II-21

Subject:

This relief request provides alternate requirements for Class 1 pressure retaining welds examinations from the inside surface of the reactor vessel required by Subsection IWA of ASME Code, Section XI, 1989 Edition (henceforth Section XI).

Components:

Class 1 Pressure Retaining Piping Welds examined from the inside surface of Pressurized Water Reactors using procedures, personnel, and equipment qualified to ASME Section XI, Appendix VIII, Supplement 2, 3, or 10 criteria.

Code Requirements:

Relief is requested from the qualification requirements for piping welds contained in Table VIII-3110-1 of Appendix VIII to ASME Section XI for:

A - Supplement 2 as applicable for Wrought Austenitic Piping Welds, and

B - Supplement 3 as applicable for Ferritic Piping Welds.

Relief Request:

Relief is requested to use the enclosed proposed alternative for implementation of Appendix VIII, Supplement 2 and 3 as coordinated with the proposed alternative for the Supplement 10 implementation program. **(Reference RR-II-20 for proposed relief to Supplement 10.)** The Performance Demonstration Initiative (PDI) will administer the alternative program.

Alternative Examination:

In lieu of the requirements of ASME Section XI, 1995 Edition, 1996 Addenda, Appendix VIII, Table VIII-3110-1, the PDI Program for implementation of Appendix VIII, Supplement 2 and 3 as coordinated with the alternative PDI Supplement 10 implementation program shall be

used **(Reference RR-II-20 for proposed relief to Supplement 10.)** The PDI Program alternative is described in pages four through nine of this request.

Basis For Relief:

Depending upon the particular design, the nozzle to main coolant piping may be fabricated using ferritic, austenitic, or cast stainless components and assembled using ferritic, austenitic, or dissimilar metal welds. Additionally, differing combinations of these assemblies may be in close proximity, which typically means the same ultrasonic essential variables are used for each weld and the most challenging ultrasonic examination process is employed (e.g., the ultrasonic examination process associated with a dissimilar metal weld would be applied to a ferritic or austenitic weld. At V.C. Summer, the applicable weld joint is the reactor vessel nozzle to pipe dissimilar metal weld.

Separate qualifications to Supplements 2, 3, and 10 are redundant when done in accordance with the PDI Program. For example, during a personnel qualification to the PDI Program, the candidate would be exposed to a minimum of ten flawed grading units for each individual supplement. Personnel qualification to Supplements 2, 3, and 10 would therefore require a total of 30 flawed grading units. Test sets this large and tests of this duration are impractical. Additionally, a full procedure qualification (i.e. 3 personnel qualifications) to the PDI Program requirements would require 90 flawed grading units. This is particularly burdensome for a procedure that will use the same essential variables or the same criteria for selecting essential variables for all three supplements.

To resolve these issues, the PDI Program recognizes the Supplement 10 qualification as the most stringent and technically challenging ultrasonic application. The essential variables used for the examination of Supplements 2, 3, and 10 are the same. A coordinated add-on implementation would be sufficiently stringent to qualify Supplements 2 and 3 if the requirements used to qualify Supplement 10 are satisfied as a prerequisite. The basis for this conclusion is the fact that the majority of the flaws in Supplement 10 are located wholly in austenitic weld material. This configuration is known to be challenging for ultrasonic techniques due to the variable dendritic structure of the weld material. Conversely, flaws in Supplements 2 and 3 initiate in fine-grained base materials.

Additionally, the proposed alternative is more stringent than current Code requirements for a detection and length sizing qualification. For example, the current Code would allow a detection procedure, personnel, and equipment to be qualified to Supplement 10 with five flaws, Supplement 2 with five flaws, and Supplement 3 with five flaws, a total of only 15 flaws. The proposed alternative of qualifying Supplement 10 using ten flaws and adding on

Supplement 2 with five flaws and Supplement 3 with three flaws results in a total of 18 flaws which will be multiplied by a factor of three for the procedure qualification.

Based on the above, the use of a limited number of Supplement 2 or 3 flaws is sufficient to access the capabilities of procedures and personnel who have already satisfied Supplement 10 requirements. 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 proposed alternative is consistent with other coordinated qualifications currently contained in Appendix VIII.

The proposed alternate program is attached and is identified as Supplement 14. It has been submitted to the ASME Code for consideration as new Supplement 14 to Appendix VIII and as of February 2002 has been approved by the Subcommittee on Nuclear Inservice Inspection.

Justification For Granting Relief:

Pursuant to 10 CFR 50.55a(a)(3)(i), approval is requested to use the proposed alternatives described above in lieu of the ASME Section XI, Appendix VIII. Compliance with the proposed alternatives will provide an adequate level of quality and safety for examination of the affected welds.

Implementation Schedule:

Implementation period will be from October 1, 2003 to April 30, 2005.

SCE&G requests that this relief be in effect for 18 months for VCSNS.

SUPPLEMENT 14 - QUALIFICATION REQUIREMENTS FOR COORDINATED IMPLEMENTATION OF SUPPLEMENT 2, 3 AND 10 FOR PIPING EXAMINATIONS PERFORMED FROM THE INSIDE SURFACE	
Proposed Requirements	**Technical Basis**
1.0 SCOPE	
This Supplement is applicable to wrought austenitic, ferritic and dissimilar metal piping welds examined from the inside surface. This Supplement provides for expansion of Supplement 10 qualifications to permit coordinated qualification for Supplements 2 and 3.	There is currently no available Code action allowing for a coordinated implementation of the fundamental qualifications required for the typical examinations performed from the ID of PWR nozzles. Without this Code Case/Change, qualifications would require an excessive amount of flawed and unflawed grading units. This proposed supplement uses the more technically stringent Supplement 10 qualification as a base and then incorporates a limited number of Supplement 2 and Supplement 3 samples. This proposal is consistent with the philosophy of Supplement 12, the proposed changes to Supplement 10, and the approved changes to Supplement 2 and 11.
2.0 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, access limitations). The same specimens may be used to demonstrate both detection and sizing qualification.	
2.1 General The specimen set shall conform to the following requirements:	
(a) Specimens shall have sufficient volume to minimize spurious reflections that may interfere with the interpretation process.	

SUPPLEMENT 14 - QUALIFICATION REQUIREMENTS FOR COORDINATED IMPLEMENTATION OF SUPPLEMENT 2, 3 AND 10 FOR PIPING EXAMINATIONS PERFORMED FROM THE INSIDE SURFACE	
Proposed Requirements	**Technical Basis**
(b) The specimen set shall include the minimum and maximum pipe diameters and thicknesses for which the examination procedure is applicable. Applicable tolerances are provided in Supplements 2, 3, and 10.	Tolerances are from the applicable Supplements because Supplement 2 and 3 dimensions and tolerances are typically based on wrought nominal pipe size that is not appropriate for DM welds that are typically associated with forged and machined safe ends.
(c) The specimen set shall include examples of the following fabrication conditions: (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); (2) typical limited scanning surface conditions (e.g., internal tapers, exposed weld roots, and cladding conditions).	
2.2 Supplement 2 Flaws (a) At least 70% of the flaws shall be cracks, the remainder shall be alternative flaws. (b) Specimens with IGSCC shall be used when available. (c) Alternative flaws, if used, shall provide crack-like reflective characteristics and shall comply with the following: (1) Alternative flaws shall be used only when implantation of cracks produces spurious reflectors that are uncharacteristic of service-induced flaws. (2) Alternative flaws shall have a tip width of less than or equal to 0.002 in. (0.05 mm).	

SUPPLEMENT 14 - QUALIFICATION REQUIREMENTS FOR COORDINATED IMPLEMENTATION OF SUPPLEMENT 2, 3 AND 10 FOR PIPING EXAMINATIONS PERFORMED FROM THE INSIDE SURFACE	
Proposed Requirements	**Technical Basis**
2.3 Supplement 3 Flaws Supplement 3 flaws shall be mechanical or thermal fatigue cracks.	
2.4 Distribution The specimen set shall contain a representative distribution of flaws. Flawed and unflawed grading units shall be randomly mixed.	Since the number of flaws will be limited words such as "uniform distribution" could lead to testmanship and are considered inappropriate.
3.0 PERFORMANCE DEMONSTRATION	
Personnel and procedure performance demonstration tests shall be conducted according to the following requirements. (a) The same essential variable values, or, when appropriate, the same criteria for selecting values as demonstrated in Supplement 10 shall be used. (b) The flaw location and specimen identification shall be obscured to maintain a "blind test". (c) 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.	
3.1 Detection Test	
(a) The specimen set for Supplement 2 qualification shall include at least five flawed grading units and ten unflawed grading units in austenitic piping. A maximum of one flaw shall be oriented axially.	

SUPPLEMENT 14 - QUALIFICATION REQUIREMENTS FOR COORDINATED IMPLEMENTATION OF SUPPLEMENT 2, 3 AND 10 FOR PIPING EXAMINATIONS PERFORMED FROM THE INSIDE SURFACE	
Proposed Requirements	**Technical Basis**
(b) The specimen set for Supplement 3 qualification shall include at least three flawed grading units and six unflawed grading units in ferritic piping. A maximum of one flaw shall be oriented axially.	
(c) Specimens shall be divided into grading units. (1) Each grading unit shall include at least 3 in. (76 mm) of weld length. (2) The end of each flaw shall be separated from an unflawed grading unit by at least 1 in. (25 mm) of unflawed material. A flaw may be less than 3 in. (76 mm) in length. (3) The segment of weld length used in one grading unit shall not be used in another grading unit. (4) Grading units need not be uniformly spaced around the pipe specimen.	
(d) All grading units shall be correctly identified as being either flawed or unflawed.	
3.2 Length-sizing Test	
(a) The coordinated implementation shall include the following requirements for personnel length sizing qualification.	
(b) The specimen set for Supplement 2 qualification shall include at least four flaws in austenitic material.	Axial flaws are not length sized in Supplement 2.
(c) The specimen set for Supplement 3 qualification shall include at least three flaws in ferritic material.	

SUPPLEMENT 14 - QUALIFICATION REQUIREMENTS FOR COORDINATED IMPLEMENTATION OF SUPPLEMENT 2, 3 AND 10 FOR PIPING EXAMINATIONS PERFORMED FROM THE INSIDE SURFACE	
Proposed Requirements	**Technical Basis**
(d) Each reported circumferential flaw in the detection test shall be length sized. When only length-sizing is being tested, 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.	
(e) Supplement 2 or Supplement 3 examination procedures, equipment, and personnel are qualified for length-sizing when the flaw lengths estimated by ultrasonics, as compared with the true lengths, do not exceed 0.75 in. (19 mm) RMS, when they are combined with a successful Supplement 10 qualification.	
3.3 Depth-sizing Test	
The coordinated implementation shall include the following requirements for personnel depth-sizing qualification.	
(a) The specimen set for Supplement 2 qualification shall include at least four circumferentially oriented flaws in austenitic material.	Axial flaws are not depth sized in Supplement 2.
(b) The specimen set for Supplement 3 qualification shall include at least three flaws in ferritic material.	
(c) 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 depth of the flaw in each region.	

SUPPLEMENT 14 - QUALIFICATION REQUIREMENTS FOR COORDINATED IMPLEMENTATION OF SUPPLEMENT 2, 3 AND 10 FOR PIPING EXAMINATIONS PERFORMED FROM THE INSIDE SURFACE	
Proposed Requirements	**Technical Basis**
(d) Supplement 2 or Supplement 3 examination procedures, equipment, and personnel are qualified for depth-sizing when the flaw depths estimated by ultrasonics, as compared with the true depths, do not exceed 0.125 in. (3 mm) RMS, when they are combined with a successful Supplement 10 qualification.	
4.0 PROCEDURE QUALIFICATION	
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 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 performance demonstration is required. The acceptance criteria of 4.0(b) shall be met.	