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SCE&G®
A SCANA COMPANY

November 3, 2003
RC-03-0229

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
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING REQUEST TO USE ALTERNATIVES TO ASME BOILER AND PRESSURE VESSEL CODE, SECTION XI, RELIEF REQUEST RR-II-20 (0-C-03-0262)

Reference:
1. SCE&G Letter to NRC (Document Control Desk), RC-03-0142, dated July 14, 2003, 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
2. NRC (K. R. Cotton) Letter to VCSNS October 27, 2003, Request for Additional Information ISI Relief Request RR-II-20 (TAC NO. MC0108)

South Carolina Electric & Gas Company (SCE&G) hereby submits the attached response to the referenced request for additional information (RAI) regarding relief requests RR-II-20 submitted by Reference 1 on July 14, 2003.

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

Very truly yours,

Stephen A. Byrne

JT/SAB/dr
Attachment

A047

c: N. O. Lorick
N. S. Carns
T. G. Eppink (w/o Attachment)
R. J. White
L. A. Reyes
K. R. Cotton
K. M. Sutton
General Managers
NRC Resident Inspector
T. A. McAlister
A. R. Caban
NSRC
RTS (0-C-03-0262)
File (810.19-2)
DMS (RC-03-0229)

South Carolina Electric & Gas Company (SCE&G)
Virgil C. Summer Nuclear Station (VCSNS)
Response to NRC Request for Additional Information (RAI)
Regarding Inservice Inspection Relief Request

RR-II-20 ADDENDA

TAC MC0108 - submittal dated July 14, 2003 (RC-03-0142) which was modified and resubmitted September 17, 2003 (RC-03-0199).

1.0 The submittal requests relief for the reactor vessel-to-primary piping dissimilar metal field welds. For the welds involved, provide (preferably in table form) the unique weld identification, inner diameter, wall thickness, and base/weld material (i. e., carbon steel, alloy steel, stainless steel, or nickel alloy).

Response 1.0:

WELD ID	DESCRIPTION	INSIDE DIA	WALL THK	BASE	WELD
CGE-1-4100A-33DM	'A' HOT NOZZLE DM WELD	29"	2.5*	SA508/SA376N	52/152
CGE-1-4100A-334DM	'A' HOT LEG PIPE DM WELD	29"	2.5*	SA376N	52/152
CGE-1-4100A-16DM	'A' COLD LEG DM WELD	27.5	2.375*	SA508/SA351	82/182
CGE-1-4200A-1DM	'B' HOT LEG NOZZLE DM WELD	29"	2.5*	SA508/SA376N	82/182
CGE-1-4200A-16DM	'B' COLD LEG NOZZLE DM WELD	27.5	2.375*	SA508/SA351	82/182
CGE-1-4300A-1DM	'C' HOT LEG NOZZLE DM WELD	29"	2.5*	SA508/SA376N	82/182
CGE-1-4300A-16DM	'C' COLD LEG NOZZLE DM WELD	27.5	2.375*	SA508/SA351	82/182

* These are design wall thickness numbers and are not inclusive of reinforcement at the weld.

1.1 The submittal proposed using an 7.38-percent root mean square percentage (RMSP) of the through-wall pipe thickness as the error for the personnel and procedure. By the nature of the calculations, the RMSP does not provide sufficient information on the effectiveness of the performance demonstration because the RMSP is a composite of presumably easy to size shop welds and generally harder to size field welds. Because the RMSP number is so large, it lacks meaningful bounding limits. Its application does not provide for conservatism with respect to flaw evaluations. Provide an error value from the PDI performance demonstrations measured error values that are applicable to the VCSNS field welds and justify how it provides a high level of confidence in flaw depth sizing. Justify the acceptability of the selected error value and discuss its application in your flaw evaluations.

Response 1.1:

The Appendix VIII flaw depth sizing acceptance standard is 0.125" rms error, where rms means "root-mean-squared". The parameter rmsp is simply the rms error achieved during the performance demonstration expressed as a percentage of wall thickness. The motivation for using rmsp is that flaw evaluation procedures and flaw acceptance criteria are expressed in terms of *a/t*, where *a* is the flaw through-wall size and *t* is the wall thickness. Thus, rmsp relates the sizing error to a parameter more meaningful to structural integrity analysis than is an absolute error. The parameter rmsp, therefore, provides the same fundamental information on sizing performance, as does the absolute error rms.

Supplement 10 (dissimilar metal welds) performance demonstrations includes both field and shop weld configurations. The procedure that will be used for VC Summer hot and cold leg weld examinations achieved an rms depth sizing error of 0.189" when sizing from the inside surface, which is equivalent to 7.38% rmsp for the wall thickness range in the demonstration test set. The demonstration consisted of approximately twenty measurements of depth in field weld configurations and a similar number of measurements in shop weld configurations.

Neither the ASME Code nor PDI operating procedures address separate field and shop weld configurations; all demonstrations are performed using a set of specimens with both field and shop welds. The following table contains this information as requested by the RAI:

Configuration	rms (inches)
Shop weld	0.146
Field weld	0.218
Combined	0.189
ASME Code criteria	0.125

The proposed procedure to address sizing of flaws that may be found during the examination is to add to the measured flaw size the difference between the achieved sizing error and the 0.125" Appendix VIII acceptance criterion. The following table shows these calculations for the case where field and shop welds are to be treated separately.

Configuration	rms-0.125 (1nches)
Shop weld	0.021
Field weld	0.093
Combined	0.064

Further analysis of the performance on field welds only was performed to obtain estimates of the confidence of flaw depth measurement. The results of linear regression analysis of true size versus UT measured size is shown in the following table:

Slope	0.90
Intercept	0.080"
Correlation coefficient	0.90

This strong correlation gives confidence in the capability of the procedure to reliably measure flaw size, although the associated error is 0.093". Furthermore, all flaws in the Supplement 10 test set were correctly rejected by the procedure, that is, no flaw was either missed or undersized enough to be incorrectly accepted.

1.2 The submittal shows sketches of two transducers but does not explain their importance. Provide a discussion on when and where these transducers will be used.

Response 1.2:

The figure illustrates an expected performance benefit from using smaller transducers. The final version of the qualified procedure planned for VC Summer calls for a .86" sq. transducers as the detection units. The same size units are used for flaw sizing up to 1.5" depth.

1.3 The submittal references an ET procedure for performing the additional ET examination. Does this procedure satisfy the ET requirements of the 1989 Edition and 1998 Edition with 2000 Addenda of Section XI?

Response 1.3:

The ET methodology is proposed as an equivalent substitute for flaw detection on those areas of severe ID surface geometry where application of the qualified ultrasonic procedure is limited.

There are no Code mandated ET requirements for the ID examination of DM Butt welds. The referenced ET procedure is essentially the same as one used in a successful blind qualification of procedure and personnel administered by SQC (the Swedish Qualification Center) for the examination of DM welds at the Ringhals nuclear plant in Sweden.