VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

April 19, 2002

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. 02-251
NL&OS/ETS R0
Docket Nos. 50-280
50-281
License Nos. DPR-32
DPR-37

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
ASME SECTION XI REVISED RELIEF REQUESTS SR-27 AND SR-32
ALTERNATIVE REPAIR TECHNIQUE - REACTOR VESSEL HEAD AND SUPPORTING PROCEDURE QUALIFICATION RECORD

In a letter dated December 3, 2001 (Serial No. 01-637B), Virginia Electric and Power Company (Dominion) committed to provide a welding procedure qualification record (PQR) to support the NRC review of Relief Requests SR-27 and SR-32 for Surry Units 1 and 2, respectively. These relief requests would permit the use of an alternative repair technique in the event that any flaws requiring repair in reactor vessel head penetrations were discovered during reactor vessel head penetration inspections. This letter submits the PQR and a revision to relief requests SR-27 and SR-32 to resolve the one item in the PQR that did not meet a previously identified material condition in the relief request.

The PQR met the conditions of the relief request in each area except one. Specifically, the relief request required that "the average values of the three HAZ impact tests will be equal to or greater than the average values of the three unaffected base metal tests." However, testing indicated that at 30°F the average base metal impact test for mils lateral expansion was 50.3 mils compared to 47.7 mils for the HAZ. In lieu of running another PQR, Dominion is modifying the relief requests to use the PQR acceptance criteria in ASME Section III. In this instance Dominion does not seek additional relief from ASME III, but rather requests use of the provisions of ASME III for acceptance of the welding PQR.

Attachment 1 to this letter provides the PQR and Attachment 2 provides the basis and additional acceptance criteria for the welding procedure qualification. Please substitute the revised acceptance criteria to complete your review of Relief Requests SR-27 and SR-32.

A047

Please contact Mr. Thomas Shaub at (804) 273-2763, if there are any questions about this submittal.

Very truly yours,

Leslie N. Hartz
Vice President – Nuclear Engineering

Commitments made in this letter: None

Attachments

1. Framatome ANP Procedure Qualification Record 55-PQ7183-01

2. Revision to Relief Requests SR-27 and SR-32

cc: U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Suite 23 T85
Atlanta, Georgia 30303

Mr. R. A. Musser
NRC Senior Resident Inspector
Surry Power Station

Mr. R. A. Smith
Authorized Nuclear Inspector
Surry Power Station

Attachment 1

Relief Requests 27 and 32
Ambient Temperature Temperbead Weld Repair Technique

Framatome ANP
Procedure Qualification Record

Surry Power Station Units 1 and 2
Virginia Electric and Power Company
(Dominion)

PROCEDURE QUALIFICATION RECORD

PQ7183-01

PREPARED BY: _____ DATE: 02/20/02
WELDING ENGINEER

REVIEWED BY: _____ DATE: 2/20/02
COGNIZANT ENGINEER

APPROVED BY: O.E. Washey DATE: 2/20/02
MANAGER, WELDING SERVICES

RECORD OF REVISIONS

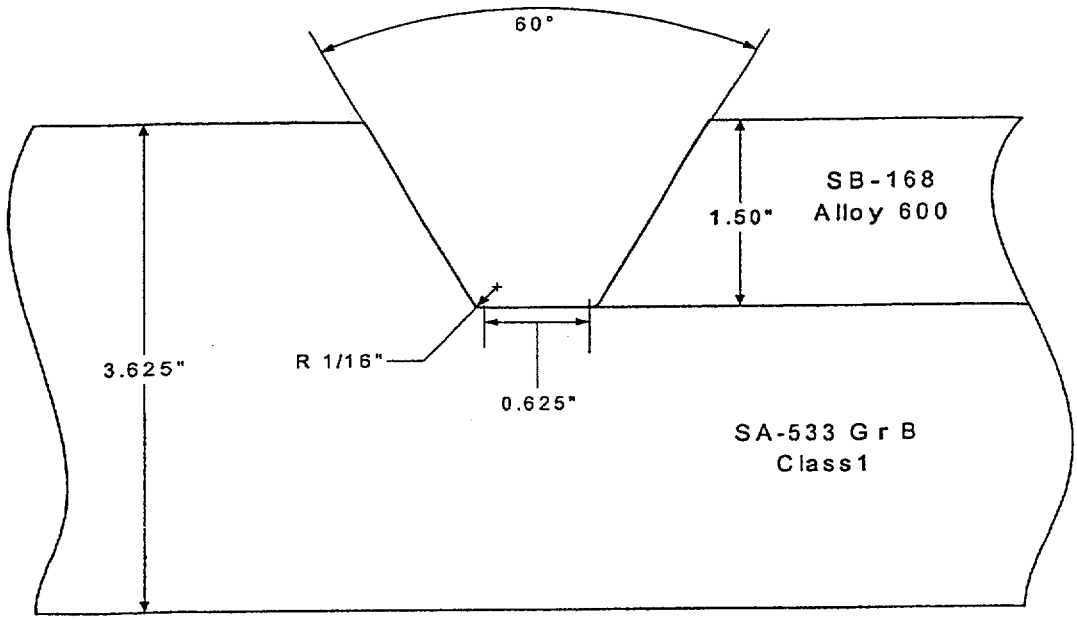
REVISION	DATE	DESCRIPTION OF REVISION
00	February 15, 2002	Original Issue
01	February 20, 2002	Corrected toughness testing column headings (MLE & % shear)

PROCEDURE QUALIFICATION RECORD

FRAMATOME ANP 55-PQ7183-01

WPS USED FOR TEST:	WP3/43/F43TBSC3-00 (Draft)	TYPE:	Machine
WELDING PROCESS (ES):	GTAW		

JOINTS (QW-402)



BASE METALS (QW-403)	
Material Spec:	SA-533 to SB-168
Type & Grade:	Grade B Class 1 to UNS N06600
P-No. / Gr. No.	P-3 Group 3 to P-43
Thickness of Coupon:	P-3 = 3.625", P-43 = 1.5"
Diameter of Coupon:	N/A
Backing Materials:	N/A
Other:	SA-533 material was stress relieved for 66 hrs. @ 1150°F before welding. Weld cavity has 6" of BM restraint.
SA-533 Heat Number:	B9064-4
SB-168 Heat Number:	34985-1B

POSITIONS (QW-405)	
Position of Groove:	3G
Welding Progression (Vertical):	Vertical up
Other:	None

POSTWELD HEAT TREATMENT (QW-407)	
Soak Temperature:	None
Time at Temperature:	N/A
Heating/Cooling Rates:	N/A
Other:	None

FRAMATOME ANP

PROCEDURE QUALIFICATION RECORD

55-PQ7183-01

FILLER METALS (QW-404)	
Weld Metal Analysis A-No.:	N/A
Filler Metal F- No.:	43
SFA Specification:	SFA-5.14
AWS Classification:	ERNiCrFe-7 (Code Case 2142)
Maximum Pass Thickness:	1st Layer - 0.080"
	2nd Layer - 0.110"
	3rd Layer - 0.110"
Consumable Insert:	N/A
Deposited Thickness:	1.5"
Size of Filler Material:	.035" diameter
Heat Number:	HT# NX2424JK

ELECTRICAL CHARACTERISTICS (QW-409)	
Electrode Type:	EWTh-2
Electrode Size:	1/8" diameter
Pulse Current (Freq/Width):	All Layers (2.0 pps / 40%)
Arc Voltage Control:	Automatic
Electrode Extension:	1/8" to 3/4"
Current - Polarity:	DC-SP (Electrode Negative)

Layer	Voltage:	Amps (P/B)	Travel (ipm)
1	9.5	210 / 115	4.5
2	9.8	280 / 120	4.0
3	10.0	280 / 120	4.0
Bal	10.0	310 / 130	3.8

Wire Feed Speed (ipm):

Layer	Primary	Background
1st	40	30
2nd	60	50
3rd	60	50
Balance	60	50

Heat Input (j/In) = (A x V x 60) / TS

Layer	Heat Input (J/In)
1st	19,380
2nd	27,048
3rd	27,600
Balance	31,895 Maximum

PREHEAT (QW-406)	
Preheat Temperature:	69° F Minimum
Interpass Temperature:	99.4° F Maximum
Other:	Water backing was utilized on the backside of the weld

GAS (QW-408)			
Purge Gas:	N/A	Flow Rate:	N/A
Shield Gas (CFH):	Argon	Flow Rate:	35 CFH
Trailing Gas:	N/A	Flow Rate:	N/A
Gas Composition:	Welding Grade Argon		
Other:	None		

TECHNIQUE (QW-410)	
String or Weave:	Stringer
Bead Width:	.270" to .420"
Single/Multiple Electrode:	Single
Single/Multipass (per side):	Multipass
Orifice / Cup / Nozzle Size:	#12
Peening:	None
Bead Overlap:	50% ± 25%
Welding System:	Dimetrics MPC & F Head
Other:	None

TOUGHNESS TESTS (QW 170)

SPECIMEN NO.	NOTCH LOCATION	SPECIMEN SIZE	TEST TEMP.	FT. LBS	MILS LATERAL EXPANSION	% SHEAR	DROP WEIGHT BREAK (Y / N)
BMDW-1	Base Metal	5/8" x 2" x 5"	-40°F	N/A	N/A	N/A	Yes
BMDW-2	Base Metal	5/8" x 2" x 5"	-30°F	N/A	N/A	N/A	No Break
BMDW-3	Base Metal	5/8" x 2" x 5"	-30°F	N/A	N/A	N/A	No Break
BMCVN-4	Base Metal	.394 x .394 x 2.165	+20°F	54	48	30	N/A
BMCVN-5	Base Metal	.394 x .394 x 2.165	+20°F	46	43	30	N/A
BMCVN-6	Base Metal	.394 x .394 x 2.165	+20°F	55	54	30	N/A
BMCVN-2	Base Metal	.394 x .394 x 2.165	+20°F	47	40	20	N/A
BMCVN-3	Base Metal	.394 x .394 x 2.165	+20°F	51	44	30	N/A
BMCVN-7	Base Metal	.394 x .394 x 2.165	+30°F	59	53	20	N/A
BMCVN-8	Base Metal	.394 x .394 x 2.165	+30°F	54	51	30	N/A
BMCVN-9	Base Metal	.394 x .394 x 2.165	+30°F	61	47	20	N/A
HAZCVN-1	Heat Affected	.394 x .394 x 2.165	+30°F	82	41	65	N/A
HAZCVN-2	Heat Affected	.394 x .394 x 2.165	+30°F	95	48	70	N/A
HAZCVN-8	Heat Affected	.394 x .394 x 2.165	+30°F	94	54	70	N/A
HAZCVN-6	Heat Affected	.394 x .394 x 2.165	+35°F	95	49	45	N/A
HAZCVN-7	Heat Affected	.394 x .394 x 2.165	+35°F	84	52	35	N/A
HAZCVN-9	Heat Affected	.394 x .394 x 2.165	+35°F	95	50	55	N/A

Comments: Base Material RT_{NDT} = -30°F.

The average absorbed energy and mils lateral expansion values obtained for Heat Affected Zone specimens 6, 7 & 9, at test temperature of +35°F equals or exceeds the base material average absorbed energy and mils lateral expansion values for Base Metal specimens 7, 8 & 9 at a test temperature of +30°F. When welding with this procedure 5°F should be added to the RT_{NDT} of the base material on which welding is performed.

All Charpy V-Notch specimens were removed at a depth of .750" transverse to the maximum working direction of the plate, which is equivalent to ½ the weld groove depth. All base metal specimens were machined with the V – notch perpendicular to the plate surface. All HAZ specimens were machined with their longitudinal axis inclined so that the V-notch would contain as much HAZ as possible.

All Base Metal Drop Weight specimens were also removed at a depth of .750".

FRAMATOME ANP

PROCEDURE QUALIFICATION RECORD

55-PQ7183-01

TENSILE TESTS (QW-150)

SPECIMEN NO.	WIDTH (inches)	THICKNESS (inches)	AREA (sq. inches)	ULTIMATE TOTAL LOAD (lb.)	ULTIMATE UNIT STRESS (psi)	TYPE OF FAILURE & LOCATION
RSTT-1	1.4406	0.74920	1.079297520	102,474	95.0	Ductile / Weld
RSTT-2	1.5074	0.75065	1.131529810	104,612	92.5	Ductile / Weld

Comments: Specimens machined per figure QW-462.1(a)

GUIDED BEND TESTS (QW-160)

SPECIMEN NO.	TYPE	FIGURE NUMBER	RESULTS
TSB-1	Side Bend	QW – 462.2	Acceptable
TSB-2	Side Bend	QW – 462.2	Acceptable
TSB-3	Side Bend	QW – 462.2	Acceptable
TSB-4	Side Bend	QW – 462.2	Acceptable

Comments:

OTHER TESTS & INFORMATION:

Type of Test:

Metallographic examination of the HAZ of three (3) weld cross-section specimens was performed. No evidence of untempered martensite was observed per WMT&R report 2-21455.

WELDER (S) NAME: Don VanSteen / Neil Whaley ID/STAMP NO: V1124 / W9849

TEST CONDUCTED BY: Westmoreland Mechanical Testing

LABORATORY TEST NO: WMT&R 2-20928

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of ASME Section XI and Code Case N-638.

Framatome ANP		02/20/02
Company	FRA-ANP Welding Engineer	Date

Attachment 2

Revision to Relief Requests 27 and 32
Ambient Temperature Temperbead Weld Repair Technique

Surry Power Station Units 1 and 2
Virginia Electric and Power Company
(Dominion)

Discussion of the Revision to SR-27 and SR-32 for Welding Procedure Acceptance Criteria

The welding procedure qualification record (PQR) complies with Relief Requests SR-27 and SR-32 in each area except one. Paragraph 2.1 (g) of the SR-27 and SR-32 states "the average values of the three HAZ impact tests will be equal to or greater than the average values of the three unaffected base metal tests." At 30°F the average base metal impact test for mils lateral expansion was 50.3 mils compared to 47.7 mils for the HAZ. In lieu of running another PQR, Dominion is modifying the relief requests to use the PQR acceptance criteria in ASME Section III. In this instance, Dominion does not seek additional relief from ASME III, but rather requests use of the provisions of ASME III for acceptance of the welding PQR. Specifically, the applicable portions of ASME III (1989 Edition) found in subsubparagraphs NB-4335.2 (b)(2) and NB-4335.2(b)(3) will be used. The changes to the ASME III wording are summarized below:

1. The sentence in subsubparagraph NB-4335.2 (b)(3) which referred to determining RT_{NDT} per NB-2331 and NB-2332 for the base materials to be welded in production was modified to reflect that the nil ductility (RT_{NDT}) temperature of the base materials to be welded was determined using the original construction Code.

2. The final three sentences of subsubparagraph NB-4335.2 (b)(3) are deleted since they would not be needed to support utilization of the Framatome PQR (the PQR produced a positive temperature adjustment).

When using the revised relief request wording to evaluate the Framatome PQR the average mils lateral expansion for the HAZ at 35°F equaled that of the average for base metal at 30°F. This yields an RT_{NDT} adjustment temperature of +5°F. In the case of the SPS 1 repairs this will result in the adjusted RT_{NDT} for the affected RV head base metal being increased from +0°F to +5°F. The increased RT_{NDT} for the head will have no impact on the operability of the head because other parts of the head and RV have higher RT_{NDT} values.

In conclusion, revising relief requests SR-27 and SR-32 to include the criteria identified above will continue to assure sound permanent repair welds and an acceptable level of quality and safety.

Revised Wording for Relief Request SR-27 and SR-32

Insert new text after existing paragraph 2.1 (g) on page 20 of 34 in Enclosure 1 of Attachment 1 to the October 30, 2001 letter. (Serial No. 01-637A)

(h) If the average Charpy V-notch lateral expansion for the heat affected zone of 2.1(g) above is less than that for the unaffected base material, and the qualification test meets the other criteria of acceptance, the Charpy V-notch test results may be recorded on the Welding Procedure Qualification Record. Data shall then be obtained as specified in 2.1(i) below to provide an additive temperature for any base material for which the welding procedure is being qualified, and shall be included. Alternatively, the welding procedure qualification may be rewelded and retested.

(i) The data for use in 2.1 (h) above shall be developed by performing additional Charpy V-notch tests on either the welding procedure qualification heat affected zone or the unaffected base material, or both, at temperatures which provide lateral expansion values equal to or greater than 35 mils. The average lateral expansion data for the heat affected zone and the unaffected base material shall be plotted on a lateral expansion-temperature chart. The temperatures at which these two sets of data exhibit a common lateral expansion value equal to or greater than 35 mils shall be determined. The determined temperature for the unaffected base material shall be subtracted from the similarly determined temperature for the heat affected zone. This difference shall be used in 2.1 (h) above as the adjustment temperature. The adjustment temperature shall be added to the highest nil ductility temperature (RT_{NDT}) temperature established by the tests from the original construction Code for all of the base material to be welded by this procedure in production.