VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

February 23, 2012

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Serial No. 12-093
NLOS/ETS
Docket No. 50-338
License No. NPF-4

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNIT 1 RELIEF REQUEST N1-I4-CMP-001
JUSTIFICATION OF LENGTH OF PROPOSED WELD OVERLAY
FOR STEAM GENERATOR HOT LEG NOZZLES

In a March 30, 2011 letter (Serial No. 11-120), as supplemented on June 29, 2011 (Serial No. 11-366) and November 10, 2011 (Serial No. 11-625), Dominion requested NRC approval for proposed alternatives to certain (ASME Code) Section XI–2004 Edition requirements associated with Steam Generator (SG) hot leg nozzle repairs. The proposed alternative will permit the application of a full structural weld overlay (FSWOL) on the Steam Generator hot leg nozzles for North Anna Unit 1. The weld overlays are required to mitigate the potential for primary water stress corrosion cracking (PWSCC) susceptibility of the dissimilar metal welds (DMW). In a January 27, 2012 letter, the NRC approved Relief Request N1-I4-CMP-001. However, the accompanying safety evaluation identifies, as a staff understanding, that the weld overlay length would be 0.75 $\sqrt{Rt}$ applied axially on both sides of the susceptible weld.

In a phone call on February 15, 2012 with the NRC staff to discuss the sizing requirements for the FSWOLs delineated in the staff's SER, Dominion informed the NRC that it was physically impossible to meet one of the requirements delineated in the staff's safety evaluation report (SER. Specifically, the 0.75$\sqrt{Rt}$ length for the weld overlay cannot be used on the pipe end due to structural interferences from the SG lower support assembly. Extension of the overlay further towards the SG is not feasible due to the excessive amount of nozzle machining that would be necessary.

The proposed FSWOL has been designed to meet the relevant Code requirements (specifically NB-3200) for transfer of the load for a postulated flaw back into the base material. The associated analysis considered design basis loads with the required safety factors applied. Therefore, the proposed FSWOL meets quality and safety standards. However, the SER discussed imposing a 0.75$\sqrt{Rt}$ length. This is mentioned in Code Case N-740-2 as a length that usually satisfies load redistribution. However, if a location's actual loading is small, load redistribution can be achieved with much shorter lengths. In this case, this is achieved at a distance less than 0.75$\sqrt{Rt}$. To ensure future ISI of the DMWs will meet Code Case N-770-1 requirements, the weld overlay length on each side of the DMW will need to be somewhat greater than the length required to satisfy NB-3200 requirements. Specifically, the overlay will extend on each side of the susceptible material

by a minimum of 3.89" on the nozzle side and 4.98" minimum on the stainless steel side before it ties back into the adjoining base metal.

In summary, the proposed weld overlay lengths selected are less than the length calculated by $0.75\sqrt{Rt}$ due to the constraints imposed by the physical conditions associated with the DMW. However, the weld overlay length is bounded by analysis and technically acceptable. The attachment provides sketches and a photo that shows the WOL dimensions and the physical obstructions, respectively.

Dominion requests the NRC's approval of the proposed sizing of the FSWOL on the Steam Generator hot leg nozzles.

As noted in the original relief request the applicable stress reports will be provided to the NRC prior to entry into Mode 4 following the completion of the weld overlays.

If you have any questions regarding this submittal, please contact Mr. Thomas Shaub at (804) 273-2763.

Very truly yours,

for L N Hartz

Leslie N. Hartz
Vice President – Nuclear Support Services

Attachment

Sketches and Photo of WOL Dimensions and Obstructions

Commitments made in this letter: None

cc: U.S. Nuclear Regulatory Commission
Region II
Marquis One Tower
245 Peachtree Center Ave., NE
Suite 1200
Atlanta, Georgia 30303-1257

Mr. J. E. Reasor, Jr.
Old Dominion Electric Cooperative
Innsbrook Corporate Center
4201 Dominion Blvd.
Suite 300
Glen Allen, Virginia 23060

NRC Senior Resident Inspector
North Anna Power Station

Dr. V. Sreenivas
NRC Project Manager
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Mail Stop O8 G-9A
Rockville, Maryland 20852

Ms. K. R. Cotton
NRC Project Manager
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Mail Stop O8 G-9A
Rockville, Maryland 20852

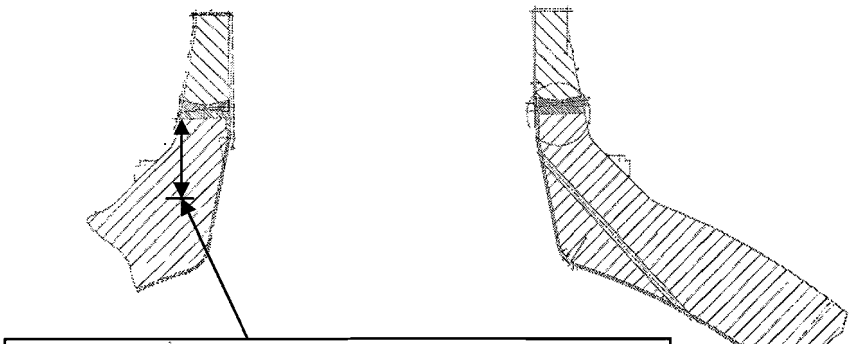
Mr. M. M. Grace
Authorized Nuclear Insurance Inspector
North Anna Power Station

Attachment

Sketches and Photo of WOL Dimensions and Obstructions

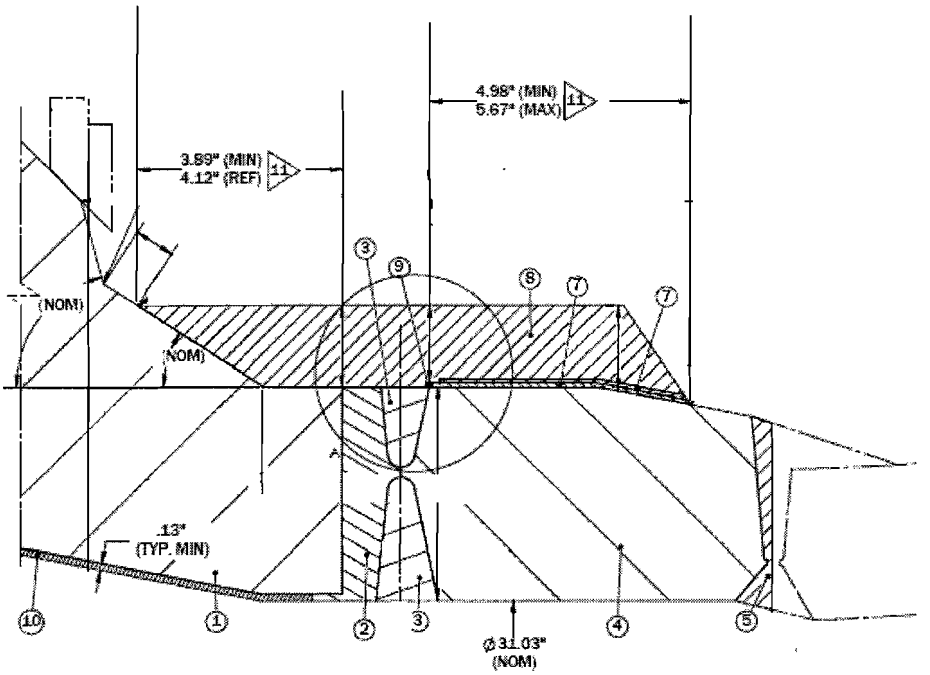
Virginia Electric and Power Company
(Dominion)
North Anna Power Station Unit 1

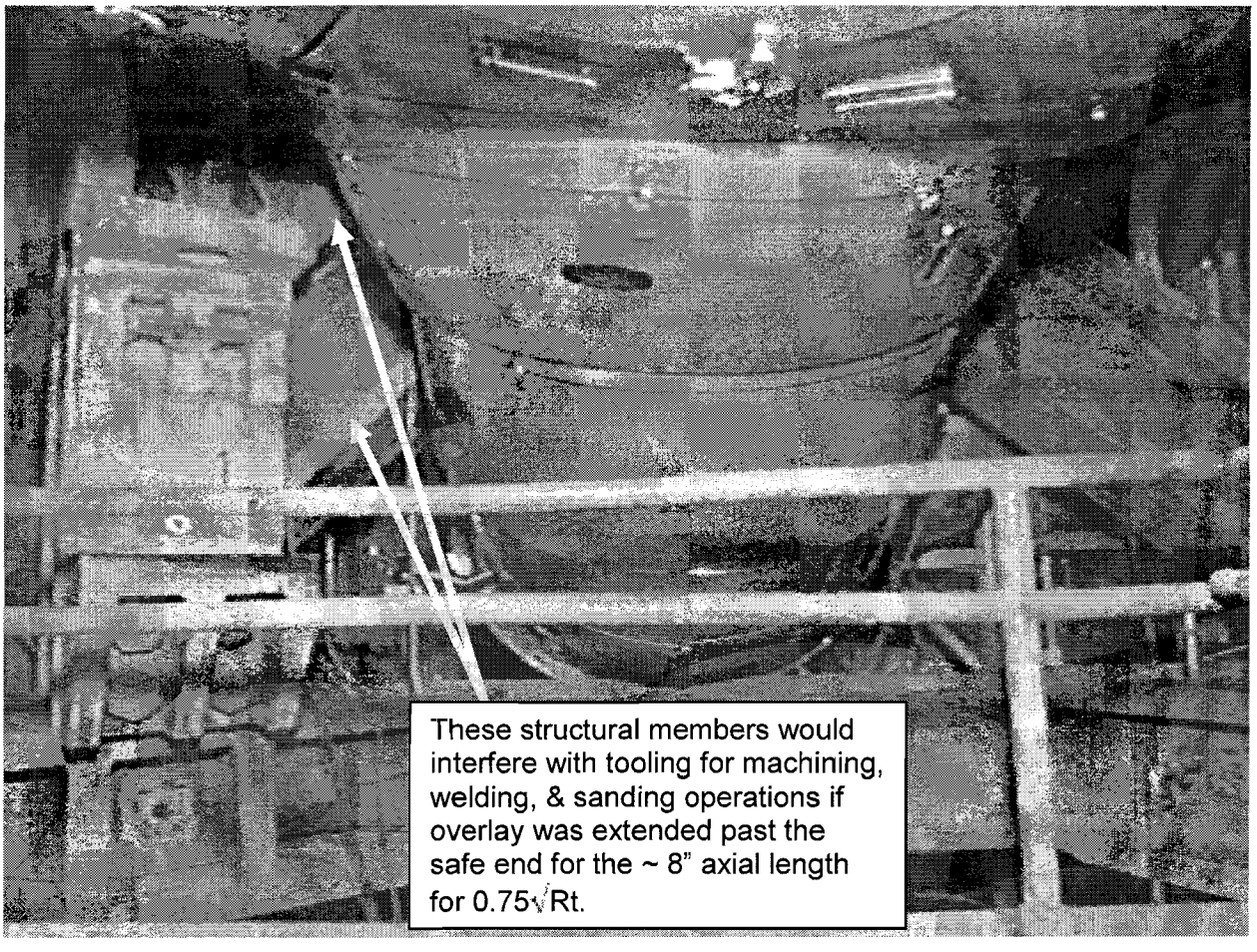
Estimate of 0.75√RT weld length location on SG Nozzle



For the ~ 8" axial length for 0.75√Rt, machining would extend to this approximate length.

Minimum and Maximum Weld Dimensions




These structural members would interfere with tooling for machining, welding, & sanding operations if overlay was extended past the safe end for the ~ 8" axial length for 0.75√Rt.