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March 8, 2005

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
Revision to the ASME Section XI Relief Request to Use Weld Overlay and Associated Alternative Techniques

REFERENCE: (a) Letter from G. Vanderheyden (CCNPP) to Document Control Desk (NRC), dated March 5, 2005, ASME Section XI Relief Request to Use Weld Overlay and Associated Alternative Techniques

In our letter dated March 5, 2005 (Reference a), we submitted a relief request pursuant to 10 CFR 50.55a(a)(3)(i). The relief requested was for two welds that will have a structural overlay applied, 2-DR-2007-1 (2" diameter drain nozzle on the No. 21 Reactor Coolant System hot leg) and 2-LD-2004-1 (2" diameter letdown line nozzle on the No. 22A Reactor Coolant System cold leg). These welds were examined under the Performance Demonstration Initiative program and determined to have unacceptable indications in the existing Alloy 82/182 welds. We believe that the indications could be due to primary water stress corrosion cracking (PWSCC) based on the signal response received during the ultrasonic test examination, which indicated crack-like responses. In addition, the material of the welds (Alloy 82/182) is known to be susceptible to PWSCC.

This letter also provides a revision to Tables 1 and 2, contained in Attachment (1) of Reference (a). Please replace Tables 1 and 2 provided in Reference (a) with the revised tables contained in Attachment (1) to this letter. The remaining information in Reference (a) remains unchanged.

Should you have questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,

GV/PSF/bjd

A047

cc: C. W. Fleming, Esquire
R. V. Guzman, NRC
S. J. Collins, NRC
Resident Inspector, NRC
R. I. McLean, DNR

ATTACHMENT (1)

REVISED TABLES 1 AND 2

ATTACHMENT (1)

REVISED TABLES 1 AND 2

Table 1

Relief Requests Related to IWA-4000

IWA-4000	Differences/Basis for Relief
IWA-4610(a) The area to be welded plus a band around the area of at least 1-1/2 times the component thickness or 5 in. (127 mm), whichever is less, shall be preheated and maintained at a minimum temperature of 350°F (177°C) for the SMAW process and 300°F (149°C) for the GTAW process during welding. The maximum interpass temperature shall be 450°F (232°C). Thermocouples and recording instruments shall be used to monitor the process temperatures. Their attachment and removal shall be in accordance with Section III.	**Relief.** In lieu of weld-attached thermocouples and recording instruments, we plan to monitor the process temperatures with non-attached devices, e.g., contact pyrometers and provide a manual record of the process temperatures. The contact pyrometers used will be calibrated in accordance with our control and calibration of measuring and test equipment program. **Clarification.** IWA-4610(a) contains two general requirements, 1) preheat and interpass temperature criteria and 2) a requirement to monitor process temperatures with thermocouples and recording instruments. The preheat and interpass temperature criteria are superceded by Code Case N-638 so no relief is requested for this requirement.

Table 2

Modifications to Code Case N-504-2

Code Case N-504-2	Differences/Basis for Relief
Reply: It is the opinion of the Committee that, in lieu of the requirements of IWA-4120 in Editions and Addenda up to and including the 1989 Edition with the 1990 Addenda, in IWA-4170(b) in the 1989 Edition with the 1991 Addenda up to and including the 1995 Edition, and in IWA-4410 in the 1995 Edition with the 1995 Addenda and later Editions and Addenda, defect in austenitic stainless steel piping may be reduced to a flaw of acceptable size in accordance with IWB-3640 from the 1983 Edition with the Winter 1985 Addenda, or later Editions and Addenda, by deposition of weld reinforcement (weld overlay) on the outside surface of the pipe, provided the following requirements are met:	**Relief.** We propose to apply Code Case N-504-2 to the ferritic (P1) and nickel alloy (F43/P43) base material as well as the austenitic stainless steel (P8) base material. Code Case N-504-2 is accepted without restriction in the current NRC Regulatory Guide 1.147. The base material will be ferritic material (P1) with existing nickel alloy weld metal (F43/P43) to which an austenitic stainless steel (P8) pipe is welded. Industry operational experience has shown that PWSCC in Alloy 82/182 will blunt at the interface with stainless steel base metal, ferritic base metal, or Alloy 52/52M/152 weld metal. For additional information on Alloy 52M, refer to the request below (weld metal).
(b) Reinforcement weld metal shall be low carbon (0.035% max.) austenitic stainless steel applied 360° around the circumference of the pipe, and shall be deposited in accordance with a qualified welding procedure specification identified in the Repair Program.	**Relief.** In lieu of austenitic stainless steel filler material, the reinforcement weld metal will be a nickel alloy. The weld metal will be ERNiCrFe-7A (Alloy 52M, UNS N06054). This weld metal is assigned F43 by ASME per Code Case 2142-2. The requirements of ASME Section III, NB-2400 will be applied to all filler material. The chromium content of Alloy 52M is 28-31.5%, identical to that of Alloy 52. The main difference in Alloy 52 versus Alloy 52M is a higher Niobium content (0.5-1%). The difference in chemical composition between Alloy 52 and Alloy 52M improves weldability of the material, pinning the grain boundaries preventing separation between grains, and hot tearing during weld puddle solidification. This filler material was selected for its improved resistance to PWSCC. Alloys 52, 52M, and 152 all contain about 30% chromium that imparts excellent corrosion resistance. The existing Alloy 82/182 weld and the Alloy 52/52M overlay are austenitic and have ductile properties and toughness similar to austenitic stainless steel piping welds at pressurized water reactor operating temperature. These filler materials are suitable for welding over the ferritic nozzle, Alloy 82/182 weld and the austenitic stainless steel piping.
(e) The weld reinforcement shall consist of a minimum of two weld layers having as-deposited delta ferrite content of at least 7.5 FN. The first layer of weld metal with delta ferrite content of least 7.5 FN shall constitute the first layer of the weld reinforcement design thickness. Alternatively, first layers of at least 5 FN may be acceptable based on evaluation.	**Relief.** Delta ferrite (FN) measurements will not be performed for this overlay because welds of Alloy 52/52M/152 are 100% austenitic and contain no delta ferrite due to the high nickel composition (approximately 60% nickel).