Case N-853  
PWR Class 1 Primary Piping Alloy 600 Full Penetration Branch Connection Weld Metal Buildup for Material Susceptible to Primary Water Stress Corrosion Cracking Section XI, Division 1

Inquiry: As an alternative to the defect removal requirements of Article IWA-4000, is it permissible to modify a full penetration branch connection (Figure 1) by deposition of a Branch Connection Weld Metal Buildup (BCWMB) and weld a branch connection to the weld metal buildup using base material and weld metal that is resistant to primary water stress corrosion cracking (PWSCC)?

Reply: It is the opinion of the Committee that, in lieu of the defect removal requirements of Article IWA-4000, a defect in Class 1 Alloy 600 full penetration primary piping branch connections may be mitigated by application of PWSCC-resistant BCWMB thereon (Figure 2) and include a replacement PWSCC-resistant branch connection, hereinafter referred to as a nozzle, to the BCWMB using PWSCC-resistant base material and weld metal (Figure 3), provided all other requirements of Article IWA-4000 and the following requirements are met.

1 GENERAL
1.1 DEFINITIONS

branch connection weld metal buildup (BCWMB): a weld metal buildup that is applied over a reactor coolant system primary piping branch connection and associated full penetration butt weld of PWSCC-susceptible austenitic nickel alloy material specified in PWSCC-susceptible materials to mitigate PWSCC.

PWSCC-susceptible materials: PWSCC-susceptible materials are UNS N06600, N06082, and W86182.

primary piping: reactor coolant system primary loop hot leg and cold leg piping that connects the reactor vessel, the steam generators, and the reactor coolant pumps.

service life: time interval for a postulated flaw to grow to the flaw depth assumed in the design of the BCWMB, replacement nozzle, and replacement nozzle weld.

1.2 MODIFICATION

(a) This Case applies to BCWMB on PWSCC-susceptible materials and welds between or including the P-No. 43 and P-No. 12, as applicable:

(b) Weld filler metal for the BCWMB and replacement nozzle weld shall be austenitic nickel alloy meeting the requirements of (d) and deposited using a welding procedure specification (WPS) for groove welding, qualified in accordance with the Construction Code and Owner's requirements, and identified in the Repair/Replacement Plan. As an alternative to the postweld heat treatment (PWHT) requirements of the Construction Code and Owner's requirements, the provisions of Mandatory Appendix I of this Case, or IWA-4600, excluding IWA-4611, may be used for temper bead welding.

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1 THE REFERENCES IN THIS CASE ARE BASED ON THE 2015 EDITION, EXCEPT WHERE REFERENCES HAVE SPECIFIC EDITION OR ADDENDA SPECIFIED. FOR USE WITH OTHER EDITION OR ADDENDA, REFER TO THE APPLICABILITY INDEX FOR SECTION XI CASES, TABLE 1.

2 P-No. 1 materials include some materials previously assigned P-No. 12A, 12B, or 12C designations by Section IX between 1967 and 1973. The old P-No. 12A, 12B, and 12C materials reassigned as P-No. 1 (SA-352 Grade LCB was reassigned as P-No. 1 Group 1; SA-508 Class 1 and SA-541 Class 1 were reassigned as P-No. 1 Group 2; SA-537 Grade B was reassigned as P-No. 1 Group 3) may be welded using the temper bead requirements of this Code Case.

The Committee’s function is to establish rules of safety, relating only to pressure integrity, governing the construction of boilers, pressure vessels, transport tanks and nuclear components, and in service inspection for pressure integrity of nuclear components and transport tanks, and to interpret these rules when questions arise regarding their intent. This Code does not address other safety issues relating to the construction of boilers, pressure vessels, transport tanks and nuclear components, and the in service inspection of nuclear components and transport tanks. The user of the Code should refer to other pertinent codes, standards, laws, regulations or other relevant documents.