

VERMONT YANKEE NUCLEAR POWER CORPORATION

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November 17, 1999
BVY 99-148

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

References: (a) American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code; Code Case N-606, "Similar and Dissimilar Metal Welding Using Ambient Temperature Machine GTAW Temper Bead Technique, Section XI, Division 1."

**Subject: Vermont Yankee Nuclear Power Station
License No. DPR-28 (Docket No. 50-271)
Use of ASME Code Case N-606 at Vermont Yankee Nuclear Power Station**

Inservice inspection efforts at Vermont Yankee (VY) during the current refueling outage have identified flaw indications on the outside surface adjacent to the safe-end weld in one of two 28" Reactor Recirculation nozzles. On 11/13/99 a liquid penetrant examination was performed on reactor pressure vessel nozzle to safe-end weld N1B-SE. The examination revealed six (6) linear indications at the austenitic weld buttering to reactor pressure vessel nozzle interface. All of the indications were evaluated in accordance with ASME Section XI, 1986 Edition, Table IWB-3514-2 inservice criteria. Four (4) of the indications were required to be considered as a single indication per Figure IWA-3400-1 separation criteria. The remaining two (2) indications were acceptable.

Subsequent to discovery of the indications, VY initiated surface conditioning ("flapper-wheeling") to enable ultrasonic sizing of the indications. A final liquid penetrant examination performed upon completion of the surface preparation revealed thirteen distinct indications that were evaluated to have three areas that, when the requirements of Figure IWA-3400-1 are applied, yielded three (3) rejectable indications. The total length of the area containing the indications remained essentially the same as prior to the surface conditioning.

Ultrasonic sizing and detection techniques were applied to the full volume of the area containing the indications in an attempt to provide data for evaluation to IWB-3514 volumetric criteria. Two (2) small areas (each approximately 0.300" in length) were able to be sized. These areas exhibited a depth of approximately 0.100" and 0.075" respectively, as measured from the outside surface. This did not provide sufficient information to allow using the volumetric criteria. At this point, VY began to formulate a repair procedure.

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10CFR50.55a(a)(3)(i) allows use of proposed alternatives to Code requirements that would provide an acceptable level of quality and safety, subject to the approval of the Director of the Office of Nuclear Reactor Regulation. Reference (a) provides an alternative method for achieving heat-affected zone (HAZ) tempering and grain refinement without elevated temperature preheat or postweld heat treatment (PWHT) in welding performed by the Machine Gas Tungsten Arc Welding (GTAW) temperbead technique.

Machine GTAW temperbead welding with non-ferrous filler metal is planned for the repair of these indications. VY seeks relief from the application of the preheat and postweld heat treatment requirements of the Construction Code (ASME Section III, 1965 Edition with Summer 1966 Addenda, as invoked by ASME Section XI) for the machine GTAW temperbead technique because it is impractical for operational reasons to drain the affected component. Performance of this repair using conventional pre-heat and postweld heat treatment methods would require draining the reactor vessel to below the nozzle elevation. The proposed alternative, which does not require vessel draining, will follow the guidance of Reference (a) with certain exceptions as described below, and thus will provide an acceptable level of quality and safety for this repair.

Reference (a), which provides an alternative to the use of preheat and post weld heat treatment for machine GTAW temperbead weld repairs of BWR Control Rod Drive (CRD) housings and stub tubes, was published by ASME in March of 1998. Temperbead welding methodology is not new. Numerous applications over the past decade have demonstrated the acceptability of temperbead technology in nuclear environments. Temperbead welding achieves HAZ tempering and grain refinement without subsequent PWHT.

Prior to ASME Code Case N-606 (N-606), temperbead requirements stipulated elevated temperature preheat and elevated temperature post-soak. Recent industry research has demonstrated that acceptable HAZ properties can be obtained without these elevated temperature requirements, enabling temperbead welding on water-filled piping systems. This research is the basis for N-606.

N-606 is the only published ASME Nuclear Code Case addressing ambient temperature temperbead welding. N-606 applicability is restricted to Class 1 BWR CRD housings and stub tube repairs; however, Vermont Yankee proposes that the NRC permit use of N-606 provisions for Reactor Vessel nozzle weld repair. The acceptability of using N-606 provisions for this nozzle repair is substantiated by ongoing ASME actions. Specifically, draft ASME Code Case N-638 (N-638) is essentially identical to N-606, except that N-638 permits ambient temperature temperbead repairs in applications such as Vermont Yankee's Reactor Vessel nozzle. N-638 has been unanimously approved by the ASME BPV Main Committee, and is awaiting publication. This approval constitutes ASME endorsement of the use of N-606 ambient temperature temperbead methodology in these applications.

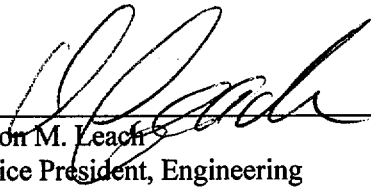
VY requests NRC approval to repair the N1B reactor pressure vessel nozzle by applying the alternative measures described in Reference (a), with the exception that applicability of the Code Case will not be limited to CRD housing and stub tube repair. This request is similar to one submitted by Duane Arnold Energy Center on November 11, 1999 (Docket No. 50-331/License No. DPR-49) for which Staff approval is pending.

VY requests your review and approval of this repair plan by November 20, 1999.

We trust that the information provided will enable you to complete your review of our request; however, should you have any questions on this matter, please contact Mr. Wayne M. Limberger at (802) 258-4237.

Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION



Don M. Leach
Vice President, Engineering

Attachment

cc: USNRC Region I Administrator
USNRC Resident Inspector - VYNPS
USNRC Project Manager – VYNPS
VT Department of Public Service

