

From: Tam, Peter
Sent: Tuesday, July 27, 2010 8:47 AM
To: Loeffler, Richard A.; Neve, Douglas A.
Cc: McLellan, Thomas; Mitchell, Matthew
Subject: Monticello - Draft RAI on Relief Request No. 16 re. nozzle-to-vessel weld exam (TAC ME3527)

Rick:

The NRC staff has reviewed and evaluated the information submitted by Northern States Power Company-Minnesota (NSPM) in its letter dated March 12, 2010, 2006 (Accession No. ML100750661). NSPM requested NRC approval of a proposed alternative to the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI inspection requirements regarding examination of certain reactor pressure vessel (RPV) nozzle-to-vessel welds and nozzle inner radii at Monticello Nuclear Generating Plant (MNGP). Specifically, NSPM proposed an alternative in accordance with ASME Code Case N-702, "Alternative Requirements for Boiling Water Reactor (BWR) Nozzle Inner Radius and Nozzle-to-Shell Welds." The applicable ASME Code, Section XI code of record for the MNGP fourth 10-year interval ISI program is the 1995 Edition through the 1996 Addenda.

The technical basis for ASME Code Case N-702 was documented in an Electric Power Research Institute (EPRI) report for the Boiling Water Reactor Vessel and Internals Project (BWRVIP), "BWRVIP-108: BWR Vessel and Internals Project, Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Inner Radii," which was approved by the NRC in a safety evaluation (SE) dated December 19, 2007 (Accession No. ML073600374). The December 19, 2007, SE for the BWRVIP-108 report specified plant-specific requirements which must be met by applicants proposing to use this alternative. NSPM has provided information in Relief Request RR-16 to demonstrate that the relevant MNGP RPV nozzle-to-vessel welds and their inner radii meet these plant-specific requirements so that the proposed alternative can be authorized. In order for the NRC staff to complete the review, additional information is needed as described below; please set up a conference call with me for the NRC staff and your personnel to discuss the following.

The December 19, 2007, NRC SE on the BWRVIP-108 report specified five plant-specific criteria that licensees must meet to demonstrate that the BWRVIP-108 report results apply to their plants. The five criteria are related to the driving force of the probabilistic fracture mechanics (PFM) analyses for the recirculation inlet and outlet nozzles. It was stated in the December 19, 2007, SE that the nozzle material fracture toughness-related RT_{NDT} (nil-ductility transition reference temperature) values used in the PFM analyses were based on data from the entire fleet of BWR RPVs. Therefore, the BWRVIP-108 report PFM analyses are bounding with respect to fracture resistance, and only the driving force of the underlying PFM analyses needs to be evaluated. It was also stated in the December 19, 2007, SE that, except for the RPV heatup/cooldown rate, the plant-specific criteria are for the recirculation inlet and outlet nozzles only because the probabilities of failure, $P(F|E)$ s, for other nozzles are an order of magnitude lower.

In RR-16, NSPM provided the MNGP plant-specific data and its evaluation of the five driving force factors, or ratios, against the criteria established in the December 19, 2007, SE. However, NSPM stated that ASME Code Case N-702 is applicable. The licensee demonstrated that the

Recirculation Outlet Nozzle did not meet the general and nozzle-specific Criteria 4 in BWRVIP-108. See the licensee's calculation below:

For the Recirculation Outlet Nozzles the licensee obtained the following values:

(Criterion 4) $(p/t) / C_{RPV} < 1.15$

$[(1025 \times 102.5) / 5.0625] / 16171 = \underline{1.28335} > 1.15$ (does not pass) (Criterion

5) $[p(r_0^2 + n^2) / (r_0^2 - n^2)] / C_{NOZZLE} < 1.15$

$[1025 (24.375^2 + 13.0625^2) / (24.375^2 - 13.0625^2)] / 1977 = 0.93623 < 1.15$

Clarify that the MNGP recirculation outlet nozzles were specifically excluded from the scope of RR-16 because of their failure to pass Criterion 4, as shown above.

The sole purpose of this e-mail is to prepare you and others for the proposed conference call. **This e-mail does not formally request for additional information, and does not convey a formal NRC staff position.**

Peter S. Tam

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(for D. C. Cook and Monticello)

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