

Staff Comments on BWRVIP-100, Rev. 1, Conference Call to Discuss Proposed Response to RAI 8

1. The staff does not agree that it is technically valid to exclude unirradiated material thermally aged at 752 deg F (400 C). This has been a standard temperature for accelerated aging simulations in duplex materials. The RAI response should provide an explanation of why the mechanism for embrittlement would differ at this temperature versus BWR operating temperatures of 550 deg F.
2. Some of the references cited by the staff indicate unaged and unirradiated austenitic stainless steel welds can have low initial toughness and a large amount of scatter. EPRI appears to be arguing that these results are not applicable to BWRVIP-100 because it is only concerned with irradiated materials, and the test of irradiated weld metal within its database are bounded by the model. However, the difference between weld metal and base metal toughness can be significant and the number of weld metal tests is relatively small. The RAI response should provide an explanation of why weld metal with low initial toughness, such as the most of the blue data points on slide 13, would not follow the same curve as the figure on slide 13 thus be not bounded by the model. Or, the RAI should explain why these low initial toughness values are not representative of welds in operating BWR core shrouds. Welds with low initial toughness would only lose toughness due to subsequent irradiation.
3. Specimen size effect – Explain why it is technically justified to exclude unirradiated weld metal data from small specimens when all the irradiated data is for small specimens.
4. Slide 12, specimen size effect from NUREG/CR-4878 – The staff does not observe significant differences in the  $J_{Ic}$  values for 9-inch planar specimen compared to the smaller specimens. The  $J_M - \Delta a$  curves extend to larger values, but over the first 0.1 inch of crack extension, there are no differences in the toughness values for larger versus smaller specimens seen in Figs. 2.4b, 6.9b, and 7.3 of NUREG/CR-4878. Figure 2.6 of NUREG/CR-4878 highlights the significant difference in toughness between weld metal and base metal specimens of the same size.
5. Slides 10 and 11, NUREG-7027 and O'Donnell data points for welds in fluence range of interest ( $1E20-3E21$  n/cm<sup>2</sup>) – Provide a justification for excluding these data points. Confirm that these data points were are excluded because the irradiation temperature does not match BWR conditions.