

September 18, 2009

Document Control Desk
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Attention: Michael McCoppin

Subject: Project No. 704 – Corrections to NRC Final Safety Evaluation of BWRVIP-76
Appendix K for License Renewal

- References: 1: Letter from Thomas B. Blount (NRC) to Rick Libra (Chairman, BWR Vessel and Internals Project) “Final Safety Evaluation (SE) for Electric Power Research Institute (EPRI) Boiling Water Reactor (BWR) Vessel and Internals Project (BWRVIP) Topical Report (TR) “BWR Vessel and Internals Project, BWR Core Shroud Inspection and Flaw Evaluation Guidelines (BWRVIP-76)’ for License Renewal (LR), Appendix K (TAC NO. MD4433,” dated August 24, 2009.
2. BWRVIP letter 2009-200 from Rick Libra (BWRVIP Chairman) to NRC Document Control Desk, “Project No. 704 – Comments and Corrections to NRC Draft Safety Evaluation of Appendix K of BWRVIP-76 (License Renewal Appendix of Core Shroud Inspection and Flaw Evaluation Guidelines),” dated June 17, 2009.

The purpose of this letter is to identify corrections and clarifications to the NRC final Safety Evaluation (SE) for the license renewal Appendix K of BWRVIP-76 that was transmitted to the BWRVIP by the Reference 1 letter identified above.

The Reference 2 BWRVIP letter identified above transmitted comments and corrections on the NRC draft SE on the license renewal Appendix K of BWRVIP-76 (core shroud inspection and flaw evaluation guidelines). Several of those comments and corrections were related to the fluence values associated with crack growth rates and fracture toughness values in several BWRVIP reports. However, the suggested corrections were not made by the NRC in the final SE.

The key correction needed regards item 4 of Section 4.1 of the final SE transmitted by the Reference 1 NRC letter. The statement in the final SE that “...crack growth rate evaluations specified in these TRs shall be used for cracked core shroud welds that are exposed to a neutron fluence value equal to or greater than 1×10^{21} n/cm² (E> 1Mev).” is not correct. Specifically, the fluence stated is not consistent with the values specified in several BWRVIP reports. The correct values for crack growth rates and fracture toughness and the associated fluences are as follows:

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BWRVIP-14 and BWRVIP-14-A: provides crack growth rates for through wall cracking in BWR stainless steel RPV internals for fluences $< 5 \times 10^{20}$ n/cm²

BWRVIP-99 and BWRVIP-99-A: provides crack growth rates for through wall cracking in BWR stainless steel RPV internals for fluences from 5×10^{20} n/cm² to 3×10^{21} n/cm²

BWRVIP-100-A: provides fracture toughness values for use in flaw evaluations as follows: Elastic Plastic Fracture Mechanics (EPFM) analyses can be used for flaw evaluation of core shrouds at fluence levels less than 3×10^{21} n/cm². Alternatively, the following analyses can be used: (a) limit load up to and including 3×10^{20} n/cm², (b) the more limiting of Linear Elastic Fracture Mechanics (LEFM) with $K_{Ic} = 150$ ksi-(in)^{0.5} and limit load for fluence greater than 3×10^{20} up to and including 1×10^{21} n/cm² and (c) the more limiting of LEFM with $K_{Ic} = 112$ ksi-(in)^{0.5} and limit load for fluence greater than 1×10^{21} but less than 3×10^{21} n/cm². At fluence levels equal to or greater than 3×10^{21} n/cm², LEFM analyses should be used with $K_{Ic} = 50$ ksi-(in)^{0.5}.

The BWRVIP requests that the NRC correct the final SE on Appendix K of BWRVIP to reflect the correct fluence values as described above. Following are suggested revisions to the item in the SE in question with additions identified with underlining and deletions identified with strikethroughs:

4. The applicants shall reference the latest NRC staff approved versions of TRs BWRVIP-14-A, BWRVIP-99-A and BWRVIP-100-A in their RVI components' AMP. The applicants shall make a statement in their LRAs that the crack growth rate evaluations and fracture toughness values specified in these TRs shall be used for cracked core shroud welds that are exposed to the neutron fluence values as specified in those reports equal to or greater than 1×10^{21} n/cm² ($E > 1$ MeV). The applicants shall also confirm that they will incorporate any emerging inspection guidelines developed by the BWRVIP for these welds.

If you have any questions on this subject please call Chuck Wirtz (FirstEnergy, BWRVIP Integration Committee Technical Chairman) at 440.280.7665.

Sincerely,



Rick Libra
Exelon
Chairman, BWR Vessel and Internals Project