Status on Stainless Steel Fracture Toughness for Reactor Internals

BWRVIP and MRP Activity Update

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BWRVIP Activities

- BWRVIP-100, Rev. 2 published May 15, 2023
  - Several changes in the fracture toughness correlations have resulted from a reevaluation of fracture toughness data of irradiated stainless steels
  - These changes impact the applicability of limit load, EPFM and LEFM as a function of fluence for evaluation of flaws in BWR reactor internals
- EPRI to submit BWRVIP-100, Rev. 2 to NRC for review in June 2023
- Follow on activities by BWRVIP:
  - Evaluate the consequences (if any) of reduced toughness on structural margins in components at lower fluence levels
    - Review inspection frequencies for components that receive low fluence (e.g., core spray line, jet pump, etc.) and determine if revised inspection frequencies are necessary
    - Complete evaluation by end of 2023
  - Consolidate flaw evaluation guidance in a TBD inspection and evaluation guidelines report for each BWR component
    - Plan to issue guideline by end of 2023

MRP Activities

- Initiated work to review existing fracture toughness evaluation criteria
  - Existing fracture toughness criteria in WCAP-17096-NP is similar to BWRVIP-100-A
  - Conservative fracture toughness values assumed for fluence levels in flawed regions
  - Previously approved by NRC in 2016 safety evaluation (SE) (ML16279A320)
- Expected deliverable from this effort will be a revision to MRP-210
- Utility review of draft report expected in 3Q2023
- Contractor to complete effort by end of 2023 (~18-month effort)
- Anticipate MRP letter transmittal to PWR Owners Group to summarize fracture toughness criteria for use in WCAP-17096-NP
  - Provide technical basis for OG to address NRC RAI/open item in safety evaluation (SE) of WCAP-17096-NP Rev.3