EPRI ELECTRIC POWER RESEARCH INSTITUTE

AMP XI.M11B
AMP XI.M31

Robin Dyle

EPRI

NRC Public Meeting on GALL-SLR
July 28, 2016

AMP XI.M11B, Cracking of Nickel-Alloy Components and Loss of Material Due to Boric Acid-Induced Corrosion

- GALL-SLR recommends a baseline volumetric inspection of PWR bottom-mounted nozzles (BMN) using “a qualified volumetric examination method”.
- 10CFR50.55a mandates use of Code Case N-722 which requires bare-metal visual (BMV) examinations
- MRP-206 serves as tech basis for N-722
- The risk evaluations that support MRP-206 show that periodic inspections as defined by this I&E guideline provide:
  - Reasonable assurance against nozzle ejection and significant head wastage
  - An extremely low frequency of damage to the nuclear fuel core associated with the potential for age-related degradation of nickel-based alloy BMNs
  - Performing a program of periodic volumetric exams of the BMN tubes in addition to the N-722-1 requirements was shown in the safety assessments to have relatively little additional benefit

AMP XI.M11B, cont'd

- Ultrasonic examinations (UT) interrogate tubing material, not the attachment j-weld
- B&W units cannot be examined via UT
- Inspections to-date have revealed two domestic units with minor indications attributed to weld defects and no base metal wastage
- Efforts to develop and implement a qualified UT program such as use Section XI Appendix VIII would be excessive in cost versus value
- NRC has made no efforts to mandate more than N-722-1 and its BMV examination in the regulations, implying adequacy for safety
- Therefore, the imposition of qualified volumetric examinations via the GALL-SLR is unwarranted

AMP XI.M31, Reactor Vessel Material Surveillance

- This AMP is complex and industry provided 14 pages of comments on this AMP alone
- The staff has worked diligently in the public meetings to understand industry's comments and offered NRC's perspective - Many items have been resolved
- One unresolved item is the GALL-SLR position that a surveillance capsule be tested during the SLR period
- The need for testing a capsule in the SLR period has not been established.

AMP XI.M31, cont'd

- Many plants will have tested all of their capsules by the end of the first license renewal period. PWR plants are likely to have 5 or 6 capsules with substantial lead factors that enabled the already pulled capsules to provide data at fluence values in excess of SLR peak values.
- The GALL SLR position will result in these plants inserting another capsule during the SLR period. This capsule will result in one additional data point:
  - that is already within the range of fluence values already provided by the existing surveillance results.
  - when 5 or 6 data points are already available, is very unlikely to have any discernable effect on chemistry factors or embrittlement trend observations.
- For weld heats that are present in multiple reactors, in excess of 10 data points may already exist. This even further negates the value of testing additional capsules.
- Insertion of a capsule is high expense and is not without risk but would offer little technical benefit and negligible improvement in safety.
- Industry's position is if a capsule has been examined in the prior 60 years of operation with a capsule fluence between 1-2 times the maximum ID fluence projected for the RPV for 80 years of operation, then withdrawal and testing of additional surveillance capsules during the subsequent period of extended operation should not be required.

Together…Shaping the Future of Electricity