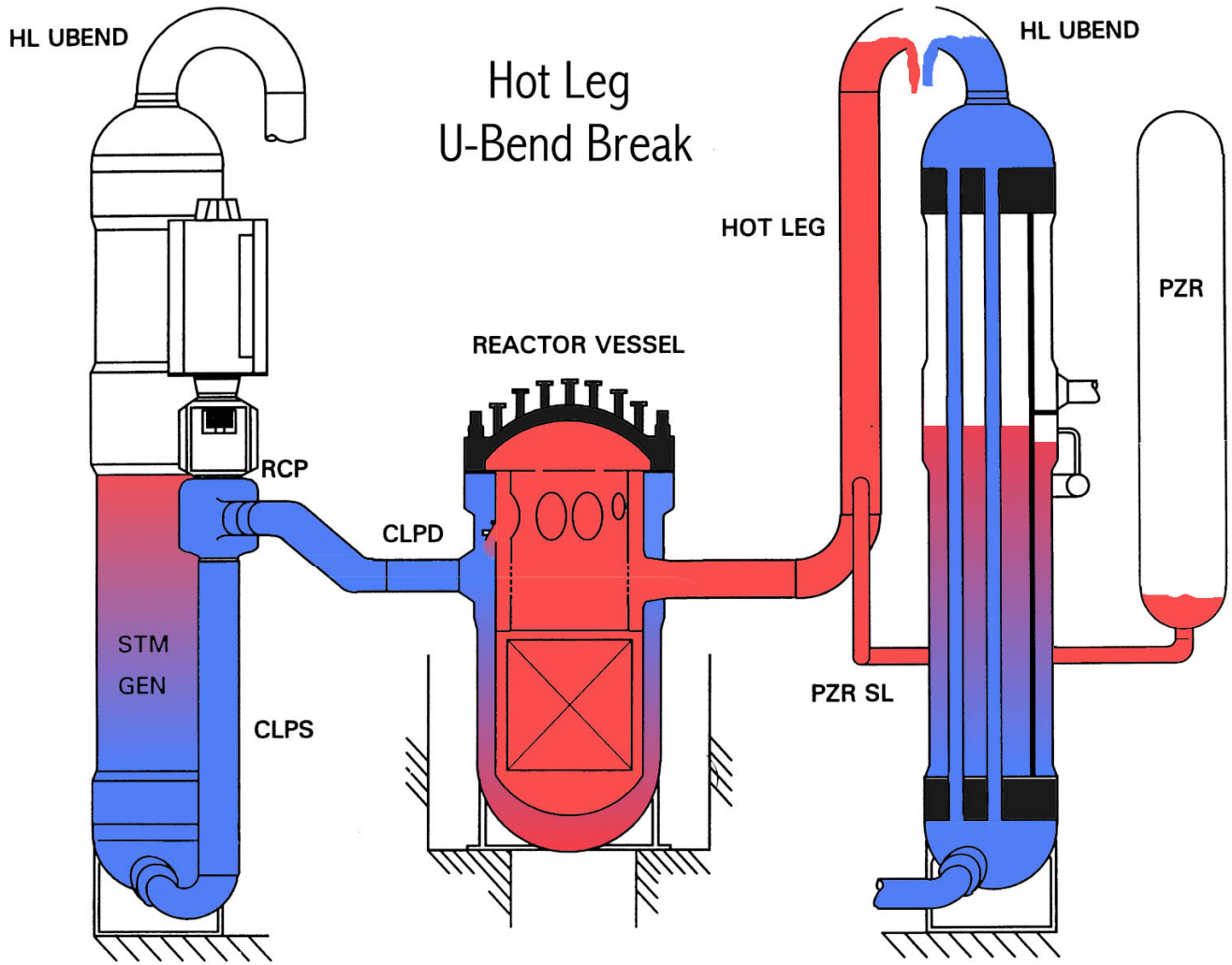
LBLOCA-Induced SG Tube Rupture

BAW-2374, Revision 2

Agenda

- BAW-2374 - Purpose / Technical Issue
- BAW-2374 Brief Revision History
- Summary
- Questions / Discussion



177 FA Lowered Loop Plant

Purpose of BAW-2374 Rev 2

- Provides technical justification to change the licensing basis of the OTSG tubes, tube-to-tubesheet joints, and tube repair products, using a risk-informed approach in accordance with RG 1.174.
  - The maximum thermal loads from a break in the hot leg large bore piping, and the subsequent possibility of induced steam generator tube rupture represent a very small risk.
  - This change to the OTSG licensing basis reduces the potential for premature plugging of steam generator tubes.
  - The existing safety analysis ensures that the limiting events, considering risk significance, have been evaluated, and that current safety margins are maintained.

BAW-2374 Revision History

- AREVA and the utilities with B&W-design plants have submitted and withdrawn two previous submittals of this report:
  - Revision 0 was too general and did not cover all of the defense in depth material.
  - Revision 1 did not address compliance to all regulations.
  - Revision 2 addresses the open items identified by the NRC when the submittal was withdrawn, and other items identified during other exchanges.
    - » Addition of numerous deterministic evaluations to support PRA, dose, mechanical (SG operability assessments, condition monitoring)

Summary & Going Forward

- The PWROG believes that an appropriate justification has been presented. Commitments are made in topical to assure LOCA-related changes are evaluated with respect to topical.
- We are at an impasse with NRC technical reviewers (primarily dose assumptions, MHA Source) and within the Owners Group
- The report has been accepted for review with a large estimate for review fees.
  - Steering Committee believes that a more economical path can be developed that leads to a high confidence for resolution.

QUESTIONS?

BAW-2374 Rev. 2 Analyses and Additions

- Demonstrate compliance with 10 CFR 50.46 long-term core cooling criterion with consequential SGTRs
- Evaluate potential for water hammer scenarios in the steam line and feedwater piping causing a break that would prevent isolation of the secondary side
- Perform a series of full deterministic analyses using the approved ECCS Evaluation Model to show the fuel pin cladding does not rupture for any upper hot leg LOCA
- Use cladding rupture study to conclude the dose consequences are bounded by other accident assessments

Commitments

1. If significant changes are made to the plant (i.e. fuel designs, ECCS flow rates, or Evaluation Model methods used to perform LOCA analyses for the B&W designed plants referencing this Topical Report), the utilities must evaluate the potential for fuel pin cladding rupture for a double-ended guillotine hot leg break that could result in consequential SGTRs.
2. The utilities referencing this Topical Report will evaluate the potential leakage rates based on the calculations in Appendix E from as-found SG tube flaws following each outage in which steam generator tube examinations are performed.