

# Agenda

- Project Overview
- Approach Summary and Results Status
  - Risk-Informed Margin Assessment
  - Consideration of Operating Constraints
- Proposed Appendix G Revision
- Discussion of NRC Comments

# Review of August Meeting and Industry Analysis Activities

William Server, ATI Consulting

Ted Meyer, Westinghouse

# Review of Industry Activities

- Meeting between industry and NRC was conducted on August 21, 2008
- This meeting is to continue the dialog and discuss the proposed approach and schedule that the industry is pursuing
- The objective for the MRP and BWRVIP industry projects is to define a risk-informed ASME XI Appendix G (heat up and cool down Pressure-Temperature limits) methodology and develop the technical justification to support a Code change

# Review of Industry Activities

- The benefit to utilities and the NRC include:
  - ASME XI Appendix G technical basis will be consistent with the new PTS technical basis
  - Methodology will be implemented in a similar manner as the current Appendix G
  - Operators will have increased operating flexibility to better enable them to avoid potential safety and operating issues, e.g., adversely affect RCP seal, etc.

# Review of Industry Activities – Technical Approach

- The high level approach is to maintain the current ASME XI Appendix G method, i.e.,

$$\text{Margin} \times K_{lm} + K_{lt} < K_{IC}$$

- Develop risk informed “Margin” (and/or combination of Margin on  $RT_{NDT}$ ) that provides assurance that the failure frequency is  $\ll 1E-6$  per operating reactor year

# Review of Industry Activities – Technical Approach

- Perform PFM Analyses using the FAVOR Code
  - Considering PWR and BWR designs and range of material properties – limiting cases defined
  - Key distributions, e.g., flaw, consistent with PTS technical basis
  - Obtain and use large set of heat up and cool down transients and operational history for PWRs and BWRs
  - Engaged the PWROG Operations and Procedures Subcommittees to gain insight regarding operations and desired benefit from this initiative
  - “Constraints” that can affect the analyses have been evaluated and integrated into the approach justification

# Review of Industry Activities – Anticipated Schedule

- Initial introduction of proposal to change ASME XI Appendix G provided at ASME XI meetings in August 2008.
- Formal presentation and proposal will be provided at the November 2008 ASME XI meeting.
- Final Report/Technical Basis will be completed by December 1, 2008
- Submittal of proposed changes to ASME XI Appendix G and the technical basis will be completed ~ January 2009.
- Balloting of proposed ASME XI Appendix G proposed changes is anticipated to be in 2010.

# Proposed Regulatory Approach

1. Develop a new ASME XI Appendix G approach using a risk-informed technical basis
2. Propose a modification to ASME XI Appendix G to define an alternative ASME XI Appendix G method that uses a risk-informed approach
3. Ballot this alternative method through ASME to establish an optional ASME XI Appendix G method
4. NRC can then amend 10 CFR 50 to incorporate by reference the ASME Code edition that includes the alternative method



# Current Status of Industry Analysis Activities

- Results are “work in progress” – future results and other input could change our approach
- Main focus for BWR vessels is related to the temperature where the leak test has to be performed
- Main focus for PWR vessels is to open the operating window at low temperature to improve plant safety
- Level A and B transients have been assessed to determine the limiting condition

# Goals for Alternative Approach

- Easy to understand and implement
- Will not require changes to the current Code fracture mechanics equations
- Will not require a change in the assumed reference flaw size
- Maintains easy to use Code computational procedures
- Consistent with risk informed approaches that have been used in other nuclear applications

# Plant Selection Criteria

- Basis was not only for the vessels with the highest  $RT_{NDT}$  values, but also others with lower  $RT_{NDT}$  values, since method needs to be applicable to any plant wanting to implement the risk informed approach – limiting plants are those with highest  $RT_{NDT}$  values
- Typical vessels with limiting plates, forgings, and welds also were selected to provide a broad spectrum of materials that can encompass the entire fleet

# Presentation Sequence

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