Risk Informing ASME Section XI Appendix G: Tasks



Risk Limit

Limiting Transient:
Cool-down

Sensitivity Study: P_{switch}, T_{switch}

HU, CD & Hydro Transients: Vetting

Upper Shelf Energy Limit

Key Interactions

Industry Coordination & Review

ACRS Review of Plans

Analyze HU, CD & Hydro Transients

Document Tech Basis

NRC Reviews:
NRR, NRO, ACRS
Public Reviews:
John Q
Industry

Finalize Tech Basis

Start Rule Making

Generalize FAVOR

Influence Coeff: [K = $\sigma \sqrt{\pi}a$ f(a/w)]

BWR Outer Surface Flaws

BWR ID Infinite Flaws

BWR Geometry Weld & Fluence Maps

Event Frequencies

Warm Pre-stress Model

NDE Flaw Sizing Error

Cyclic Plasticity

Embrittlement trend curve

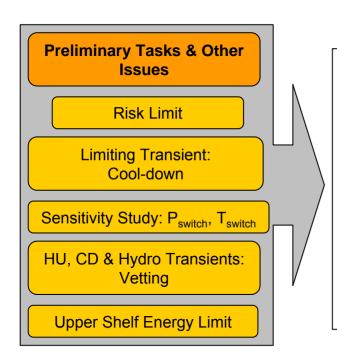
V&V FAVOR Code

Update FAVOR Manuals

End Product

Revise both 10CFR50 App G and Sec XI App G

Preliminary Tasks and Other Issues



- Risk Limit: Establish definition of vessel "failure" and numeric acceptance criteria
 - CPI, CPF, TWCIF, TWCF, ...???
- Limiting Transient: Cool-down appears to be significantly more limiting than heat-up
- Sensitivity Studies: PWR CD parameters
- HU, CD & Hydro Transients: Seeking concurrence on proposed transients
- Upper Shelf Energy Limit: Considering revising

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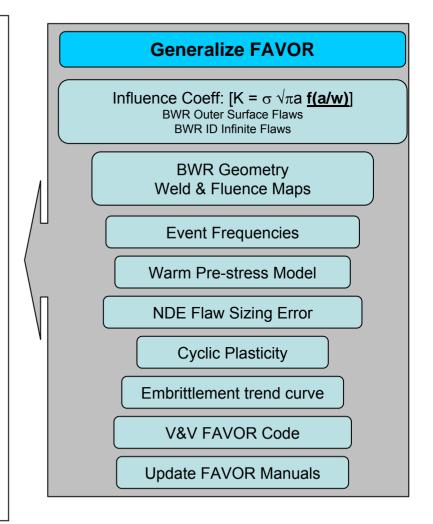
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Generalizing FAVOR

Influence coefficients:

- Inner surface breaking: RPVs with R_i/t between 10-20.
- Outer surface breaking: RPVs with R_i/t = 20
- BWR Weld & Fluence Maps: RPV plate/weld roll out diagram and fluence map for a specific vessel.
- Warm Pre-stress Model: Re-visiting existing model (not on critical path).
- NDE Flaw Sizing Error: Develop and incorporate POD and sizing error model into FAVOR (on critical path? TBD)
- Cyclic Plasticity: Incorporate cumulative effects of multiple HU/CD transients into FAVOR.
- Embrittlement Trend Curve: Incorporate latest trend curve – try to account for high fluence. (not on critical path)



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Tech Basis Review

Industry Coordination & Review

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End Product

New version of 10CFR50G?
Mod. ASME App. G?
Both?

- Industry Coordination and Review: Regular meetings (TBD) and interactions
 - Aug 21
- Draft Tech Basis Doc
 - Internal reviews
 - Public comment
- Final Tech Basis
- Rule Making
 - End Product:
 - Revise Sec XI App. G to remove excessive conservatism
 - Based on PFM
 - How it is revised is TBD (multiple options)
 - Revise 10CFR50 App. G
 - Reference Sec XI App. G to the greatest extent possible

BWR Analysis

- R_i/t for BWR > PWR
 - Influence coefficients
- BWR selected to model with FAVOR
 - Representative of high RT_{NDT} @ 60 years
 - Axial Weld
 - vessel "rollout" diagram and fluence map
- Transients
 - HU and CD follow saturation curve
 - Prefer profiles (dT/dt, dP/dt) related to operational conditions
 - Hydrostatic tests

