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NRC Public Meeting **On EPRI-NRC Coordination of NDE and Stress Analysis** **of Nickel-Base Alloy Components** **October 24, 2006**

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Agenda

- Introductions, List of Attendees, Public Meeting Protocol
- Review of NRC's Research Directions on Ni-base Alloys
- Review of EPRI/MRP's Research Directions on Ni-base Alloys
- Presentation on NRC program plans for stress analysis research
- Presentation on MRP program plans for stress analysis research
- Discuss coordination of industry & NRC programs on stress analysis
- Presentation on NRC program plans for NDE research
- Presentation on MRP program plans for NDE research
- Discuss coordination of industry & NRC programs on NDE
- Opportunity for public questions or comments EPRI/NRC/Public



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Background & Purpose of This Meeting

- **Ostensibly, to coordinate our programs in the areas of NDE and stress analysis of Ni-base alloy components**
 - A parallel meeting to talk about crack growth rates will be held at another time & place
- **First in an expected series of meetings on this general topic, eventually including aligned topics very soon (e.g., stainless steel NDE, stress and crack growth rate issues)**
- **These meetings will focus myopically on programs, and not on technical progress**
 - Where we are going, and why
 - Not on what we have learned and how
- **User Need Description**



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Stress Analysis of CRDMs

- Review work on improved stress analysis for reactor pressure vessel head (RPVH) penetration nozzles for various nozzle angles and determine at what distance above the root of the J-groove weld and what distance below the toe of the J-groove weld that hoop stresses drop to 20ksi.
- Continue ongoing analysis of the “complex model” of circumferential crack growth. Include in the analysis an application of conditions and stresses outlined by MRP-95 Rev. 1 for circumferential crack growth.



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Stress Analysis of CRDMs

- Simulate the effects of a 3-layer weld overlay on the outside diameter (OD) of the improved stress analysis for RPVH Penetration Nozzles. Determine the effective change on stresses on the inside diameter of the penetration nozzle and on the OD above the weld.
- Continue probabilistic analysis work to assess the risk of failure and leakage caused by PWSCC of nickel-base alloys in reactor pressure boundary components. Compare and contrast results with the information provided in MRP-105, "Probabilistic Fracture Mechanics Analysis of PWR Reactor Pressure Vessel Top Head Nozzle Cracking," and MRP-116, "Probabilistic Risk Assessment of Alloy 82/182 Piping Butt Welds."



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Location and Morphology of PWSCC Flaws

- Develop and maintain a robust updatable database of PWSCC occurrences (both international and domestic) in nickel-based alloys in reactor pressure boundary components and NDE effectiveness in detection and characterization of PWSCC.



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PRA Related to PWSCC of Ni-base Alloy Components

- Continue probabilistic analysis work to assess the risk of failure and leakage caused by PWSCC of nickel-base alloys in reactor pressure boundary components. Compare and contrast results with the information provided in MRP-105, "Probabilistic Fracture Mechanics Analysis of PWR Reactor Pressure Vessel Top Head Nozzle Cracking," and MRP-116, "Probabilistic Risk Assessment of Alloy 82/182 Piping Butt Welds."



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Non-destructive Examination of PWSCC Flaws

- Complete research work on effects of flaws in weld materials for Alloy 182/82 and continue work on the material property effects of flaws in Alloy 152/52/52M. Include an ASME Code Section III stress limit analysis to determine acceptable levels of construction related indications.