



# **WRAP-UP PLENARY**

## **Session 3**

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**Management of Age-Related  
Materials Degradation Issues**



# General Observations

- Presentations focused on several areas:
  - Degradation of reactor vessel and internals
  - Buried Piping
  - Concrete structures
  - Fatigue
  - Reducing uncertainties



# General Observations

- Tools such as the Materials Degradation Matrix could help target research
  - Environmental effects on fracture resistance/fatigue
  - SCC of Ni-base alloys and stainless steels
  - Effect of fluence on SCC and crack growth
- Coatings important to protect structural materials and piping
  - potential application of nanotechnology



# Suggested R&D Topics

- Combined effects testing of reactor materials
- Complex alloy aging fundamentals
  - Late blooming phases
  - How microstructure effects bulk properties
- Sustainability of the mitigation processes
- Concrete damage models and mitigation technology
- CASS and concrete inspections
- Alternates to existing coating technologies
- Welding and weld repairs
- Developing a damage tolerant approach to fatigue



# Suggested R&D Topics

- **Concrete Structures**
  - Develop better NDE techniques for thick, heavily reinforced concrete
  - Improved damage models & acceptance criteria for condition assessment
  - Develop an industry-wide Operating Experience Database
- **Buried Piping**
  - Development of better inspection methods
  - Methods to repair buried piping in-situ
  - Selection and qualification of better materials



# Suggested R&D Topics

- Potential reactor component degradation
  - Thermal & irradiation embrittlement
  - Understanding complex alloys and their aging mechanisms
  - SCC & IASCC of stainless and Ni alloys
  - Determination of acceptability based on a mechanistic understanding of damage



# Topics for Further Discussion

- Suggested prioritized research pathways
  - Research to establish effective age management programs
  - Improved models/experiments/probes to understand degradation mechanisms and radiation response