

Materials Degradation Issues

John Sieber

Current Issues

- **Cracking of PWR VHP nozzles.**
- **Boric acid wastage of the RPV head ferritic base metal**
- **RPV lower head penetration leakage**
- **Other Alloy 600 applications and weldments**

Industry Response

Industry tasks for EPRI

- **Cracking susceptibility algorithm**
- **Inspection protocol and techniques**
- **Industry inspection database**
- **Prediction methodology for VHP boric acid corrosion**

Regulatory Response

- **Bulletins 2001-01,2002-01,2002-02 and 2003-02**
- **Order EA-03-009**
- **Information Notice 2003-11**
- **Davis Besse Lessons Learned Task Force Action Plan**

ACRS Activities

- **The staff has kept the ACRS regularly informed of the progress of industry and staff work**
- **ACRS issued letters on July 23, 2001, June 20, 2002 and May 16, 2003**

ACRS Conclusions and Recommendations

- **Sound technical basis for VHP degradation plan**
- **Action plan needs to be augmented**
- **Develop capability to predict RPV lower head penetration cracking**

ACRS Conclusions and Recommendations (cont'd)

- **Augment current flaw evaluation guidelines**
- **Qualify inspection methods**
- **Manage other degradation modes**
- **NRC/Industry collaboration is needed**

Proactive Life Management of Materials Degradation Issues

- **Roles of utility, reactor designer, and NRC**
- **Requires adequate knowledge of chemistry, materials, and mechanical aspects**
- **Balance between degradation prediction and inspection capabilities**

Proactive Life Management of Materials Degradation Issues (cont'd)

- **Concept of “Proactive Materials Degradation Assessment” plan seems appropriate**
- **Will review industry and NRC plans**

ACRONYMS

- **EPRI – Electric Power Research Institute**
- **PWR – Pressurized Water Reactor**
- **RPV – Reactor Pressure Vessel**
- **VHP – Vessel Head Penetration**