

**Research on
Steam Generator
Action Plan DPO Issues**

**Commission Meeting
December 3, 2001
Dr. Joseph Muscara
Office of Nuclear Regulatory
Research**

Research Activities

- **Current issues and anticipatory research**
- **Confirm effectiveness of current regulations or recommend improvements**

Research Activities

- **Materials behavior and structural integrity**
- **Accident analysis - thermal hydraulics**
- **Improved risk methods**
- **80% of DPO milestones addressed by RES**

Crack Propagation Under Main Steam Line Break (MSLB) Loads

- **Estimate loads, crack growth, and margins 12/31/02**
- **Conduct tests to validate the analytical results 06/30/03**

Jet Cutting

- **Complete tests of jet impingement under MSLB and severe accident conditions, draft reports 12/31/01**
 - **Erosion rates are 2-5 mil/hr for severe accident conditions**
 - **5% to 25% wall loss after 2 hours under MSLB conditions**
- **Jet cutting not a concern**

Tube Conditions During Severe Accidents

- **Computational Fluid Dynamics (CFD) analysis of the hot leg & steam generator to determine Tmax in tubes**
 - **Benchmarked against data 8/01**
 - **Full-scale CFD model under development 3/02**

Constant Probability of Detection (POD)

- **Complete analysis and document results 12/31/01**
 - **POD curves developed as a function of flaw parameters**
 - **Topical report was peer reviewed and is in publication**

Stress Corrosion Cracking

- **Long term understanding of mechanisms**
- **Evaluate crack initiation, evolution and growth 12/31/05**
 - **Realistic loads & environments**
 - **Alloys 600 and 690**
- **Develop models to predict cracking of tubes 12/31/06**

Conclusions

- **Some research completed to resolve DPO issues-Jet Impingement, POD**
- **Research to address most DPO issues by 2003**

Conclusions (continued)

- **Long-term research on degradation mechanisms will continue through 2006**
- **RES & NRR working closely to implement research in resolution of issues**