



RIC 2005

Session C3 -- Research Activities

Research Activities on Materials Aging Management

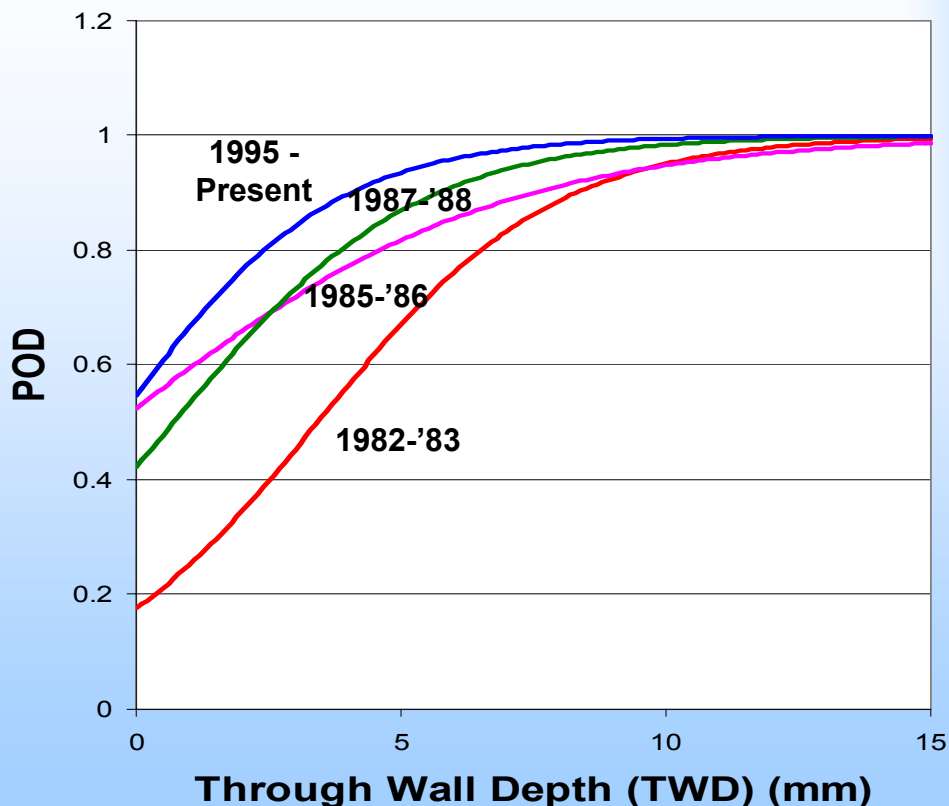
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March 9, 2005



Current NDE Is Better Than 10-20 Years Ago

- Probability of Detection (POD) has improved with time and improved techniques
- Smaller transducers help solve access problems
- Signal processing (and transducers) reduce noise effects
- Improved technologies
 - SAFT-UT
 - Phased Arrays





Performance Demonstration Is a Clear Benefit

- PDI Program to qualify inspectors and NDE procedures, in response to ASME Code Section XI, Appendix VIII
- Large number of inspectors tested have produced a large amount of aggregated data
- Capabilities and reliability have improved
 - Inspectors and techniques can be assessed quantitatively
 - Technology improvements can be implemented widely
 - Observed need for retraining and requalification
- The approach may be extended to other NDE methods, beyond UT
- Ongoing interactions between industry and NRC



NDE Capabilities

- The industry is refining and developing NDE techniques for characterizing known degradation mechanisms
 - Fatigue
 - IGSCC in BWR internals, steam generator tubes
 - Boric acid corrosion (BAC), wastage
 - PWSCC
 - Mockups being developed to approximate component geometries, relevant flaw characteristics
 - CRDM cracking, piping dissimilar metal welds
- Weaknesses remain



What Are the Weaknesses?

- Screening techniques for degradation we have not seen yet, damage precursors
- Maintaining inspector skills
 - Number of qualified inspectors declining
 - Costs, cost sensitivity are increasing
 - Relatively few flaws are found in the field
 - How to set re-training intervals?
- Improving efficiency of inspections
 - Pressure from decreasing outage times
 - Maintaining or improving effectiveness, reliability



Challenges for the Future

- Motivating research on NDE
 - Development of new technologies
 - Advances in existing techniques
 - Transducers
 - Signal processing
 - Shifting emphasis from reactionary to exploratory work
- Remaining material challenges
 - Coarse-grained materials (Inconel, cast SS, DMWs)
 - Weld geometry and access issues
 - Damage precursors, new degradation mechanisms