

Materials Degradation Matrix and Issue Management Tables Overview

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Materials Initiative NEI 03-08

- NEI 03-08 became effective January 2004
- Genesis of current materials focus
- Established strategic oversight by CNOs
- Elevated the expectation for proactive and strategic management of materials aging
- Brought multiple programs under one umbrella

Programs Under NEI 03-08 Today

- EPRI
 - BWRVIP
 - NDE APC
 - MRP
 - PSCR
 - SGMP
 - Water Chemistry Committee
- PWROG MSC

Implementation Tools

- Tools needed to effectively manage multiple groups with varied scopes
- Developed a Strategic Plan
- Materials Degradation Matrix (MDM)
- Issue Management Tables (IMTs)

Materials Degradation Matrix (1)

- Identify all relevant materials
- Develop a fundamental understanding of degradation phenomena/mechanisms
- Identify knowledge gaps and potential areas for additional research

Materials Degradation Matrix (2)

- Rev. 0 & NUREG-CR-6923 (PMDA) aligned on key issues
- Rev 2, published August 2010 considered:
 - Operating Experience (US and International)
 - New Research Results
 - Materials Aging for 80-year plant operation

Issue Management Tables (1)

- Evaluates MDM gaps based on safety and operational impact
- Prioritize projects for gap closure including Inspection, Mitigation Repair & Replace options
- Prioritize Research

Issue Management Tables (2)

- Identify License Renewal needs/options
- Share issues and priorities with NRC
- Rev. 2 of the BWR and PWR IMTs reflect Rev. 2 of the MDM (80 years)

Current Focus

- Environmental Effects on Fracture Resistance
- Environmental Effects on Fatigue Life
- SCC of Ni-Base Alloys and Stainless Steels
- Effect of Fluence on SCC Susceptibility and Crack Growth Rates
- Effect of Fluence on Reactor Vessels
- PWR Reactor Internals Inspections
- Alloy 52 welding issues

Conclusion

- NEI 03-08 provided strategic framework for materials aging management
- Use of MDM/IMT led to:
 - Better tools to address aging management for current and license renewal terms
 - More proactive research on aging and mitigation options
 - Appropriate Inspection Programs
 - Integrated strategy across the fleet with CNO engagement and oversight
 - Effective communication with NRR and RES

Acronyms (1)

- NEI - Nuclear Energy Institute
- CNO - Chief Nuclear Officer
- BWRVIP – Boiling Water Reactor Vessel Internals Project
- NDE - Non-destructive Examination
- APC – Action Plan Committee
- MRP – PWR Materials Reliability Project
- PSCR – Primary Systems Corrosion Research Committee
- SGMP – Steam Generator Management Program

Acronyms (2)

- PWROG MSC - PWR Owners Group Materials Subcommittee
- MDM - Materials Degradation Matrix
- IMTs - Issue Management Tables
- PMDA – Proactive Materials Degradation Assessment
- SCC – Stress Corrosion Cracking
- PWR - Pressurized Water Reactor
- BWR – Boiling Water Reactor