

Using Risk and Safety Insight to Inform Aging Management Activities at Fuel Cycle Facilities

Overview of the EPRI Aging
Management Activities

Emma Wong
Electric Power Research Institute
Senior Technical Leader

NRC Regulatory Information Conference
March 12, 2019

  
www.epri.com

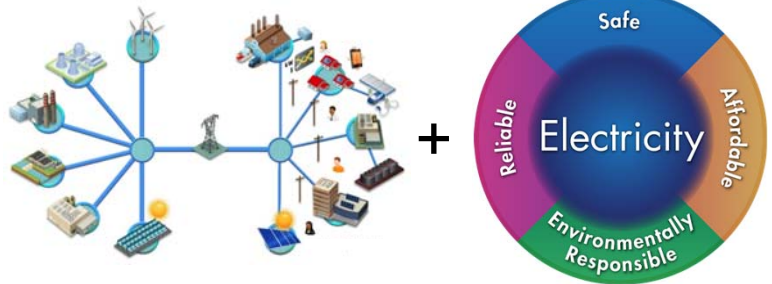
© 2019 Electric Power Research Institute, Inc. All rights reserved.



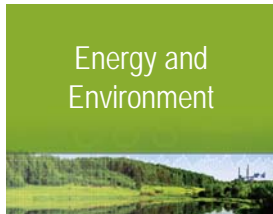
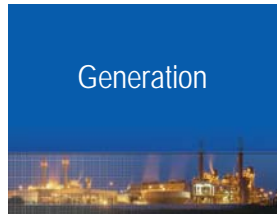
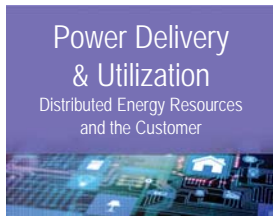
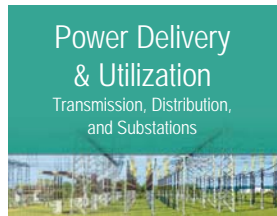
EPRI's Strategic Direction



Innovative solutions that enable the transformation of power systems to be more *flexible, resilient, and connected* to provide society with *safe, reliable, affordable, and environmentally responsible* electricity



About EPRI Research

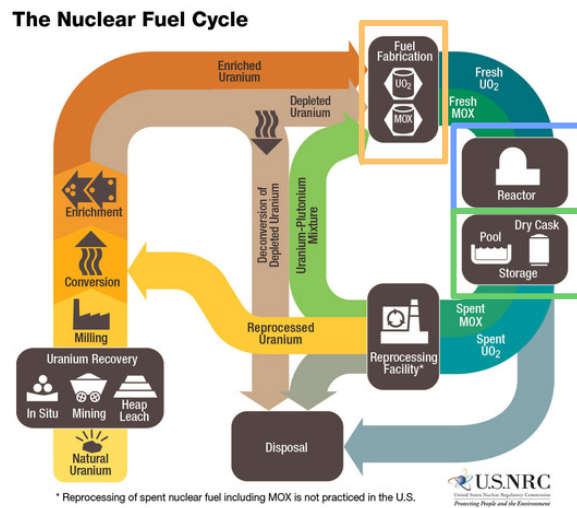


Nuclear Related Structures – Aging Management

Aging Management of Nuclear-Related Structures

Contributes to the overall safety and reliability of nuclear power...

- Operating Reactors
- Dry Storage
- Fuel Cycle Facilities



EPRI has decades of experience developing technical guidance for operating reactors & dry storage that could be adapted & applied to fuel cycle facilities

Aging Management Goals and Objectives



Technical basis for decision to operate through extended life time

- Supports business case for life extension and refurbishments

Technology to manage nuclear structure assets throughout their lifetime

- Aging management, asset management, and risk management
- Address safety, performance and costs

Aging Management Technical Basis



Assessment

- What to inspect and when
- Inspection options
- How to disposition any observed degradation

Mitigation and Testing

- Prevent or reduced degradation
- Irradiated material testing
- Non-irradiated material testing

Inspection

- How to inspect
- What equipment and techniques are available
- What are the associated uncertainties
- What techniques need to be improved

Technical Support

- Review of inspection results
- Guidelines review and maintenance



Over 200 EPRI technical reports contribute to the aging management technical basis for operating reactors and dry storage

Aging Management Guidance Examples

- Operating Reactor Aging Management “Tools”
 - “Electrical Tools” -- License Renewal Electrical Handbook
 - “Mechanical Tools” -- License Renewal Non-Class 1 Mechanical Implementation Guideline and Mechanical Tools
 - “Structural Tools” -- License Renewal Aging Effects for Structures and Structural Components
- Dry Storage Aging Management
 - Welded Stainless Steel Canister Breach Consequence Analysis Scoping Study
 - Aging Management for Welded Stainless Steel canisters
 - Inspection and Delivery System Development and Field Trials for Dry Canister Storage System Evaluation
 - Welding and Repair Technology: Canister Mitigation and Repair Subcommittee-Industry Progress Report

Dynamic Aging Management Programs

Research Results



Inspection Findings



Global Operating Experience



Guidance for 'how to do' aging management is established, used, and could be applied to fuel cycle facilities

EPRI Identification and Detection of Aging Training

Custom Training Module Options (Custom Training)

1. Fundamentals of Aging Degradation and Management (1 Day) **(Updating in 2019)**
2. Metals Aging Degradation Mechanisms (1 Day) **(Updating in 2019)**
3. Concrete Aging Degradation Mechanisms (1/2 Day) **(Updating in 2019)**
4. Polymers Aging Degradation Mechanisms (1 Day) **(Updating in 2019)**
5. Protective Coatings and Linings Aging Degradation Mechanisms (1/2 Day) **(Updated in 2018)**
6. Electrical, Electronic, and I&C Equipment Degradation Mechanisms (1 Day) **(Updating in 2019)**
7. Selective Leaching (1/2 Day) **(New in 2018)**
8. Radiation of Concrete (1/2 Day) **(New in 2018)**
9. Fundamentals of Managing Aging Programs USA (1/2 Day) **(New in 2018)**
10. Fundamentals of Managing Aging Programs (International) (1/2 Day) **(New in 2019)**



**Updates to include: Addition of Current EPRI Reports,
Current Technology, International Aspects (GALL & IGALL), etc.**

Risk-Informing Aging Management Activities

- Currently, engineering knowledge is used in aging management to prioritize scope and implementation
- Operating Reactor and Dry Storage
 - Consider the impact to plant safety and operations and personnel radiation exposure from inspections and application of repair or mitigation strategies
 - Understanding the technical basis for aging management allows the industry to risk-inform the timing and rigor of aging management activities
- Fuel Cycle Facilities
 - Leveraging information from Integrated Safety Assessments for fuel cycle facilities (e.g., likelihood, consequence) in the context of aging management would need to be considered carefully



This Photo by Unknown Author is licensed under [CC BY-SA](#)

Fuel Cycle Facilities Aging Management

Decades of Research on Aging Management...

- Hundreds of technical reports and guidance related to aging management that could be applied to fuel cycle facilities
 - Operating reactors aging management
 - Dry storage aging management
- Aging management could be risk-informed using technical basis information
- Existing training could be attuned for fuel cycle facilities



[This Photo](#) by Unknown Author is licensed under [CC BY-NC-ND](#)



Together...Shaping the Future of Electricity

