



## CHALLENGES FOR SUBSEQUENT LICENSE RENEWAL

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## Background

- Atomic Energy Act
  - 40-year license to operate nuclear power plants
  - Allows for license renewal up to 20 years (e.g., 40 to 60 years)
- License Renewal Rule – 10 CFR Part 54
  - Can apply 20 years before license expiration per 54.17(c)
  - Must apply at least 5 years before expiration per 2.109(b)
  - A renewed license may be subsequently renewed per 54.31(d)
  - No restrictions on number of subsequent renewals or changes in requirements

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## Background (continued)

- Focus of license renewal review
  - Managing the effects of aging of long-lived, passive structures and components important to plant safety
  - Items cannot be scoped out of license renewal consideration based on risk
  - Per Standard Review Plan, "a program based solely on detecting structure and component failures is not considered an effective aging management program" (A.1.2.3.4.4)
- License renewal is a mature process
  - Licenses renewed for 62 out of 104 plants
  - Current reviews for 20 more plants
- 8 plants beyond 40 years
  - 7.5 cumulative reactor-years beyond 40

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### Subsequent License Renewal Focus Areas

- Technical issues
- Guidance documents for operation to 80 years
- Application characteristics

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### Technical Issue Areas

- Activities looking at identification of potential new aging phenomena – locations, forms, severity
  - Known mechanisms that could become more active – incubation times, activation energies, late blooming phases
  - New phenomena
  - Workshops with industry and international colleagues
  - Expanded materials degradation assessment (EMDA)
  - Results from 1<sup>st</sup> renewal aging management programs
    - Both "one-time" and periodic programs
  - Relevant domestic and international operating experience

It is difficult to simulate 80 years of aging when plants are just over 40 years old

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### Technical Issue Areas (cont.)

- Adequacy of AMPs – need new or enhanced AMPs ?
  - Considering phenomena of concern
  - Assess performance of 1<sup>st</sup> renewal aging management programs
    - Inspection methods, accessibility, frequency
- How to address primary limiting items
  - Reactor pressure vessel
  - Concrete structures
  - Cables

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## Guidance / Application Process

- Guidance
  - Develop GALL applicable for operation up to 80 years
  - Develop LR-SRP applicable to LRAs for 80 years of operation
  - Revision to NEI 95-10 ?
- LRA
  - Format changes needed ?
  - Self assessment of AMP effectiveness ?
- Public involvement and input
  - Workshops – starting later this summer

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## NRC Tasks on Subsequent Renewal

- Hold NRC/industry workshops on operating experience and industry research activities
- Develop an expanded materials degradation assessment
- Assess results from implementation of Aging Management Programs
- Share expertise; domestic and international

**Only the first phase to develop a comprehensive basis for license renewal beyond 60 years**

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## Workshops on Subsequent Renewal

- February 19-21, 2008 - Joint NRC/DOE Workshop on U.S. Nuclear Power Plant Life Extension Research and Development
  - Long-Term Reliability Observations
  - Aging Management Observations
  - New Technologies Observations
- February 22-24, 2011 – 2<sup>nd</sup> Joint Workshop
  - Industry presentation focus was on plans and roadmaps
  - New technical information was sparse

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### Conclusions from First Workshop: Potential Roles and Responsibilities

- **Industry has lead role to drive the process and identify issue resolutions**
- NRC's primary role is to ensure plant safety
  - Coordinate and collaborate on confirmatory research efforts
- DOE will facilitate R&D and coordinate national laboratory efforts
- Industry, national laboratories, academia, and international collaborators will conduct necessary R&D

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### Industry Resolution of Technical Issues

- Reports of initial applications for subsequent renewal in **2017 - 2019**
- Will industry have identified the needed technical issue resolutions to support this schedule for subsequent renewal applications?
- Industry should identify specific deliverables and schedules to support initial application submittals

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