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NRC Status and Plans for License Renewal

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OUTLINE

- Background on License Renewal Reviews
- Subsequent Renewal
- Conclusions

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Nuclear Power Plant Licensing

- Atomic Energy Act
  - Plants licensed to operate for 40 years
  - Allows for license
- Regulatory Process (10 CFR Part 50)
  - Regional inspections
  - Safety issue resolutions
  - Plant specific issue resolutions
  - Materials aging & degradation issues important to safety are addressed in a variety of ways
    - ✓ Rule changes
    - ✓ Generic communications
    - ✓ Orders
    - ✓ Voluntary actions

License Renewal Rule – 10 CFR Part 54

- License Renewal Rule – 10 CFR Part 54
  - Renewal for up to 20 years (e.g., 40 to 60 years)
  - 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
- Focus is on managing the effects of aging of long-lived, passive structures and components important to plant safety
  - Other aspects of original license are not reconsidered
  - "A program based solely on detecting structure and component failures is not considered an effective aging management program"

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License Renewal Safety Principles

- The ongoing regulatory process is adequate to ensure the safety of currently operating plants
- The same plant operating rules apply during the renewal term
  - Requires additional actions for aging management of passive, long-lived plant structures and components for license renewal

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License Renewal Process

- Submittal of Application - Integrated Plant Assessment
  - Aging management review
  - Aging management programs
  - Time-limited aging analyses
- Safety Review
  - Regional Inspection
  - Advisory Committee on Reactor Safeguards
- Environmental Review (10 CFR 51)
- Hearing Opportunity
- Agency Decision
- Regional Inspection before end of 40 years

License Renewal Status

- 104 operating reactors in the U.S.
  - 69 PWRs
  - 35 BWRs
- Renewed Licenses issued for 68 units at 40 sites
- Reviewing applications for 14 units at 10 sites
- 9 plants have entered their 41st year of operation; first was in April 2009
  - 10 cumulative reactor-years beyond 40

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Scope of License Renewal Review

- Safety-related systems, structures, and components (SSCs)
- Non-safety related SSCs: failure could affect safety-related SSC functions
- SSCs relied upon for compliance with the Commission's regulations for:
  - Fire Protection (10 CFR 50.48)
  - Environmental qualification (10 CFR 50.49)
  - Pressurized thermal shock (10 CFR 50.61)
  - Anticipated transients without scram (10 CFR 50.62)
  - Station blackout (10 CFR 50.63)

Electrical Cable Submergence

- Issue
  - Audits identify underground cables subject to wet environment
- Status
  - Inspection program to verify that licensees are maintaining cables dry
  - NRC improving electrical testing guidance

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Electrical Cable Submergence

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Concrete Issues

- Issue
  - Cracks and spalling create integrity concerns
  - Alkali-silica reaction
- Status
  - Enhanced commitments for examinations and criteria for repair

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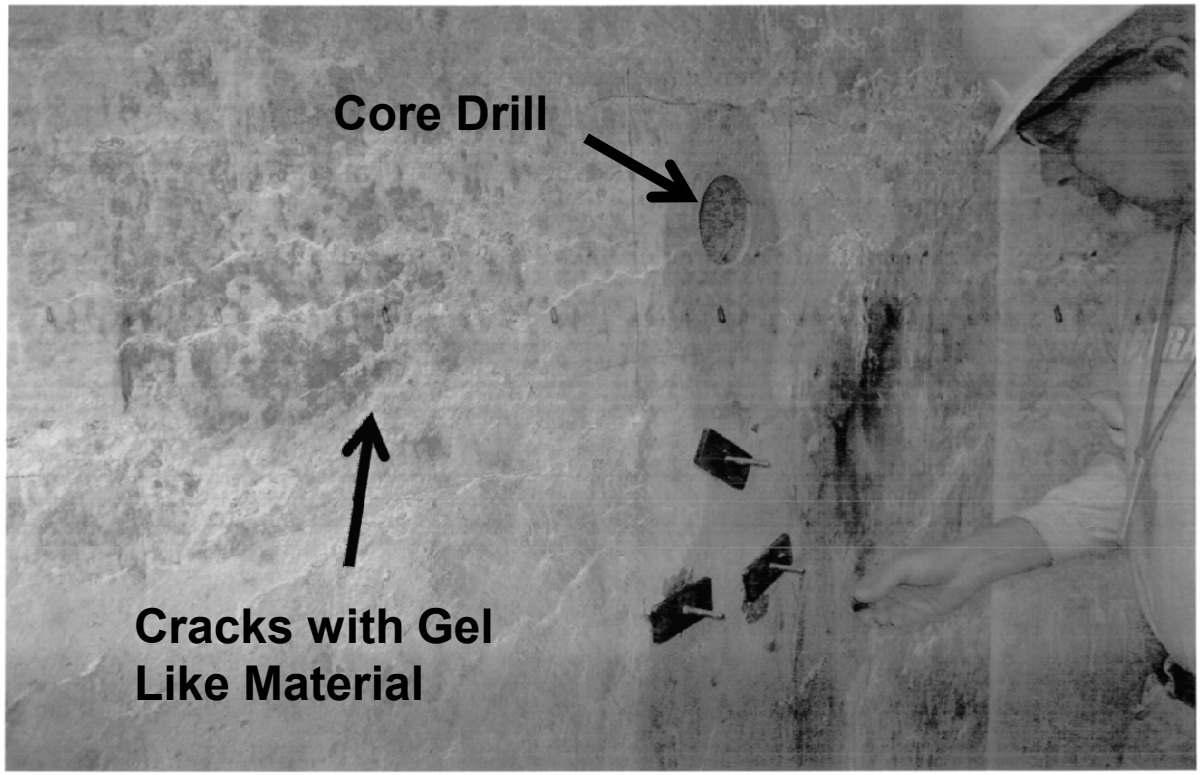
Concrete Degradation



Industry Considering Subsequent Renewals

- Anticipate first submittal(s) in 2015 to 2019 ??
- Industry has lead role to submit applications and identify resolution of technical issues
- NRC looking at need for changes to regulatory processes, and evaluating both guidance and regulations
  - Including technical issues (safety and environmental)

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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 Concerns

- 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
- Approaches for identifying potential aging phenomena
  - Workshops with industry and international colleagues
  - Expanded materials degradation assessment (EMDA)
  - Results from 1st 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 oldest plants are just over 40 years old

Technical Issue Areas

- Adequacy of aging management programs (AMPs) – need new or enhanced AMPs ?
  - Considering phenomena of concern
  - Assess performance of 1st renewal aging management programs
    - Inspection methods, accessibility, frequency
- How to address primary limiting items
  - Reactor pressure vessel integrity
  - Degradation and integrity of structures
  - Cable aging

Guidance / Application Process

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

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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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AMP Effectiveness Audits

- Review both one-time and periodic AMPs
- Assess findings – unanticipated or expected degradation found, or confirm no degradation
- Accessibility issues, adequacy of methods
- Trending information (mainly existing programs)
- First plants – Ginna and Nine Mile Point

Bottom line – Evaluate effectiveness of AMPs and enable an assessment of the need for new or enhanced AMPs to address subsequent renewal

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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 – 2nd Joint Workshop
  - Industry presentation focus was on plans and roadmaps
  - New technical information was sparse

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Industry Resolution of Technical Issues

- With indications that initial applications for subsequent renewal will be submitted **2015 - 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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Conclusions

- Licenses have been renewed for 2/3 of plants
- Subsequent renewal challenges
  - NRC assessing need for changes to regulatory processes
  - Resolution of technical issues by industry is critical to enable acceptable applications for subsequent renewal
    - Industry must take an active lead to develop resolutions to technical issues
      - Adequate understanding of degradation mechanisms
      - Sufficiency of aging management approaches
    - NRC will evaluate acceptability of proposed resolutions