Spent Fuel Storage Renewal

• 10 CFR §72.42 and §72.240
  – Renewal of independent spent fuel storage installation (ISFSI) licenses and storage cask design certificates of compliance (CoC) for a period not to exceed 40 years
  – The safety analysis report must include
    • Time-limited aging analyses
    • Aging management programs (AMPs) for addressing issues associated with aging degradation of SSCs
Storage License/Certificate Renewal Applications

- Site Specific
- General CoC

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Storage Renewal Framework

**Standard Rev NUREG-1927, R1**
- Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel
- Final Report
- June 2016

**MAPS NUREG-2214**
- Managing Aging Processes In Storage (MAPS) Report
- Draft Report for Comment
- Oct 2017

**Inspection Manual TI 2690/001 → IP**
- NRC Inspection Manual
- Draft for Comment
- Feb 2018

**ASME Code**
- 2010 ASME Boiler and Pressure Vessel Code
- XI Rules for Inservice Inspection of Nuclear Power Plant Components

**NEI 14-03, R2**
- NEI 14-03 Edition E
- Format, Content and Implementation Guidance for Dry Cask Storage Operations-Based Aging Management
- Draft NEI 2017

*Draft NUREG-2214 ADAMS ML17289A237*
Purpose of NUREG-2214

• Clarity of NRC staff technical position
  – Technical bases for credible aging mechanisms
  – Acceptable aging management activities

• Efficiency in the preparation and review of storage renewal applications
  – Reference to NUREG-2214 in applications will allow the staff to focus its review on those areas where the applicant proposes an alternative approach

• NUREG-2214 is not a new set of requirements; it is one acceptable approach to demonstrate compliance with existing requirements
Renewal Application

**Scoping**
Identify SSCs that impact safety

**Aging Management Review**
- Define materials and environments
- Evaluate aging mechanisms/effects

- **Not credible**
- **No action**

- **Credible**

**Time-Limited Aging Analyses**
(or other supporting analyses)

**Aging Management Programs**
## Storage Systems Evaluated

Addresses upcoming certificate of compliance renewals through 2029

<table>
<thead>
<tr>
<th>Docket ID</th>
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<tr>
<td>72-1004</td>
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Evaluation of Aging Mechanisms

- Identify the “credible” mechanisms that may impact an important-to-safety function
- Similar to existing guidance (EPRI Mechanical Tools; EPRI Structural Tools; NUREG-1801 GALL Report; ANL Managing Aging Effects Report)
- MAPS excerpt:

<table>
<thead>
<tr>
<th>Material</th>
<th>Aging Mechanism</th>
<th>Credible Environments</th>
<th>Noncredible Environments</th>
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<td>General corrosion</td>
<td>OD, SH, DW, GW, E-C</td>
<td>E-M, E-NS, HE</td>
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<td>Pitting and crevice corrosion</td>
<td>OD, SH, DW, GW, E-C</td>
<td>E-M, E-NS, HE</td>
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<td>Galvanic corrosion*</td>
<td>OD, SH</td>
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<td>3.2.1.3</td>
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</table>

[outdoor (OD), sheltered (SH), demineralized water (DW), Groundwater (GW), Helium (HE); Encased (E) in concrete (C), metal (M), and neutron shield material (NS)]
Aging Management Review

- Apply the aging mechanism conclusions to subcomponents of each storage system design

MAPS excerpt:

<table>
<thead>
<tr>
<th>Structure, System, or Component</th>
<th>Intended Safety Function</th>
<th>Material</th>
<th>Environment</th>
<th>Aging Mechanism</th>
<th>Aging Effect</th>
<th>Aging Management</th>
<th>Technical Basis (Section)</th>
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<tr>
<td>Shell</td>
<td>CO, SH, SR, TH*</td>
<td>Stainless steel (welded)</td>
<td>Sheltered</td>
<td>Stress corrosion cracking</td>
<td>Cracking</td>
<td>Localized Corrosion and Stress corrosion Cracking of Welded Stainless Steel Dry Storage Canisters AMP</td>
<td>3.2.2.5</td>
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- A renewal applicant may reference these conclusions; the staff will use them as a check against the application
Aging Management Programs

- Localized Corrosion and Stress Corrosion Cracking of Welded Stainless Steel Dry Storage Canisters
- Reinforced Concrete Structures
- External Surfaces Monitoring of Metallic Components
- Ventilation Systems
- Bolted Cask Seal Leakage Monitoring
- Transfer Casks
- High Burnup Fuel Monitoring and Assessment
Corrective Actions

• Example AMPs use the licensee’s corrective action program to address monitoring and inspection results that do not meet acceptance criteria

• Example AMPs also include periodic evaluations of industry-wide operating experience and AMP effectiveness

• NRC oversight of corrective actions:
  – Daily resident inspector review of identified conditions
  – Periodic regional and resident inspections of storage sites
  – AMP-specific oversight (NRC Temporary Instruction → Inspection Procedure)
Next Steps

- Evaluate comments and revise report
- Considering public meeting request
- Publish final report and document comment resolution: Spring 2018
  (coordinating with other NRC guidance)
Abbreviations

- ADAMS – Agencywide Documents Access and Management System
- AMP – Aging Management Program
- CoC – Certificate of Compliance
- IP – Inspection Procedure
- ISFSI – Independent Spent Fuel Storage Installation
- MAPS – Managing Aging Processes in Storage
- NEI – Nuclear Energy Institute
- SSC – Structure, System, and Component
- TI – Temporary Instruction
- TLAA – Time-Limiting Aging Analyses