Update on NRC Transportation and Storage Activities and Decommissioning

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Council of State Governments
Midwestern Radioactive Materials Transportation Committee
St. Louis, Missouri

December 1, 2016
Overview

• Reactor Decommissioning Activities
• Draft Managing Aging Processes in Storage (MAPS) Report
• WCS Application
• Greater than Class C Waste
• Safety of Spent Fuel Transportation
• NRC Issues Paper on Revisions to Transportation Regulations
• Questions
Reactors Decommissioning Options

• DECON: Equipment, structures, etc removed or decontaminated to a level that permits release

• SAFSTOR: Plant placed in a safe stable condition and maintained in that state until it is subsequently decontaminated to levels that permit release

• ENTOMB: Plant is encased in a structurally long-lived substance to allow decay until levels permit unrestricted release (not currently available)
Ongoing Activities in Reactor Decommissioning

• 19 power reactors in decommissioning
  – 6 in active DECON or active dismantling
  – 13 in SAFSTOR or deferred dismantlement

• power reactors announcing permanent cessation of operations by 2019
  – James A. Fitzpatrick
  – Pilgrim Nuclear Power Station
  – Oyster Creek Nuclear Generating Station
  – Clinton
  – Quad Cities
Decommissioning in Midwest States

• Illinois
  – Zion 1 & 2 (DECON)
  – Dresden 1 (SAFSTOR)

• Michigan
  – Big Rock Point (ISFSI only)

• Nebraska
  – Ft. Calhoun (SAFSTOR)

• Wisconsin
  – LaCrosse (DECON)
  – Kewaunee (SAFSTOR)
Maine Yankee
Maine Yankee
Zion
Draft Managing Aging Processes in Storage (MAPS) Report
Background

- NRC staff experience with the renewal of licenses and certificates of compliance for the storage of spent nuclear fuel revealed a need for expanded guidance.

- NRC team assessed current regulatory framework to determine what changes were needed.
  - NUREG-1927, Rev. 1 (Standard Review Plan for storage renewals) - issued June 2016
  - Managing Aging Processes in Storage (MAPS) Report
  - Guidance for NRC oversight of licensees’ aging management activities
  - Regulatory Guide on the use of NRC and industry guidance for renewal applications
Infrastructure for Updated Storage Renewal Framework

TI / IP Inspections
SRP 1927R1
Staff consideration of Stakeholder inputs
MAPS
Managing Aging Processes in Storage (MAPS) Report
RG
Regulatory Guide

Technical Issue Resolution
Consensus Codes
Storage/Reactor OpE
SRP NUREG-1927R0
NEI 14-03
DOE/ANL Report
MAPS Report –
What it will provide

• Clarity of NRC staff technical position
  – Identification of the credible aging mechanisms and appropriate aging management activities
  – Applicants must still show that the generic guidance is applicable to their specific sites and CoCs

• Efficiency in the preparation and review of renewal applications
  – Reference to the MAPS guidance in renewal applications will allow the staff to focus its review on those areas where applicants propose an alternative approach
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Chapter 4
Evaluated Storage Systems

- MAPS addresses a variety of designs and near-term renewal applications
  - Standardized NUHOMS (horizontal welded canister)
  - HI-STORM 100 (vertical welded canister: concrete overpack)
  - HI-STAR 100 (vertical welded canister: metal overpack)
  - TN-32, 68 (vertical metal bolted cask)
- Lessons can be extended to other systems
- Future revision of MAPS will incorporate additional designs
Chapter 4
Aging Management Tables

Aging management review results for all components in the selected storage systems

Example: HI-STORM 100 overpack outer shell

<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>
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<td>Outer shell</td>
<td>SR</td>
<td>Steel</td>
<td>Air - outdoor</td>
<td>General corrosion</td>
<td>Loss of material</td>
<td>External Surfaces Monitoring of Metallic Components AMP</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Microbiologically influenced</td>
<td>Loss of material</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>corrosion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fatigue</td>
<td>Cracking</td>
<td>A TLAA or a supporting calculation may be needed</td>
</tr>
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</table>
Chapter 5
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*

[*largely consistent with NUREG-1927, Rev 1]
Example

HI-STORM 100

FSAR

<table>
<thead>
<tr>
<th>Primary Function</th>
<th>Component</th>
<th>Safety Class</th>
<th>Codes/Standards (as applicable to component)</th>
<th>Material</th>
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MAPS aging management table

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NMSS

Divison of Spent Fuel Management
MAPS: External Surfaces Example AMP

- **Inspection Method:**
  - Visual inspections in accordance with ASME Code Section XI for VT-3
- **Coverage:**
  - All accessible external surfaces
- **Sample Size:**
  - All casks
- **Frequency:**
  - At least once every 5 years
- **Acceptance Criteria**
  - No detectable loss of material
  - No corrosion products
  - No coating defects
Path Forward

• Spring 2017: Issue draft guidance for public comment
• Fall 2017: Present final guidance to ACRS
• Winter 2017: Publish final guidance

• NUREG-1927, Rev. 1:
  ADAMS Accession No. ML16179A148
WCS Application

• Status
  – License application
    • April 28, 2016
  – Requests for Supplemental Information (RSI)
  – 4th input received November 16, 2016
  – Final input planned for mid-December

• Environmental review
  – NRC’s intent to prepare an EIS and conduct a scoping process
  – 81 FRN 79531
  – Scoping period begins on Nov 14, 2016, and if the application is docketed, will end 45 days after publication of a notice of docketing the application
Greater Than Class C Waste

- 10 CFR 61.55
  - Class A, B, C [GTTC]
- Transported under US DOT and US NRC transportation regulations
- If stored on an ISFSI
  - 10 CFR 72.212 assessment needed
Safety of Spent Fuel Transportation

- NUREG/BR-0292, Rev 1
- August 2016
- ML16237A133
NRC Issues Paper on Proposed Revision to the Transportation Regulations

• Issues paper (ML16299A298)
• FRN (81 FR 83171)
  – Public meeting December 5 – 6, 2016
  – 60 day comment period - November 21, 2016 through January 20, 2017
• Electronically on Federal Rulemaking Website: http://www.regulations.gov, Docket ID NRC-2016-0179
• Mail comments to: Cindy Bladey, Chief, Rules, Announcements, and Directives Branch (RADB), Division of Administrative Services, Office of Administration, Mail Stop: OWFN-12-H08, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001
Radiation level limits
49 CFR 173.441(b)

- Open transport
- Exclusive use
Radiation level limits
49 CFR 173.441(b)

- Closed transport
- Exclusive use