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CoC Renewal: CoC Holder Perspectives

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Agenda

- ▶ Introduction
- ▶ The NUHOMS® Storage System
- ▶ The CoC Renewal Application – Challenges
- ▶ The CoC Renewal Application
 - ◆ Lead Canister Inspections
 - ◆ Emergent Issues – CISCC
 - ◆ Storage of HBU
- ▶ The CoC Renewal Application – AMP Development Approach
- ▶ Conclusions

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Introduction

- ▶ Certificate of Compliance (CoC) 1004 for the NUHOMS® Horizontal Storage System issued January 23, 1995.
- ▶ Current expiration date January 23, 2015.
- ▶ AREVA TN will submit a 40-year CoC 1004 renewal application
 - ◆ First active CoC renewal application
 - ◆ Over 500 NUHOMS® systems deployed at ISFSIs in the US

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NUHOMS® Dry Storage System Components

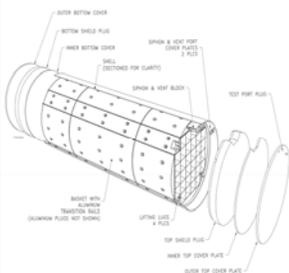
- ▶ Dry Shielded Canister (DSC)
 - ◆ Shell Assembly: confinement; double redundant, welded closures
 - ◆ Basket Assembly: thermal/structural/criticality
- ▶ Horizontal Storage Module(HSM)
 - ◆ Reinforced concrete: shielding, thermal, and structural support. Environmental and natural phenomena protection
- ▶ Transfer Cask (TC)
 - ◆ Support loading operations
 - ◆ Used for transferring the loaded DSC from the SFP building to the HSM at the ISFSI location
- ▶ Auxiliary Equipment

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NUHOMS® Dry Storage System Components Dry Shielded Canister (DSC)



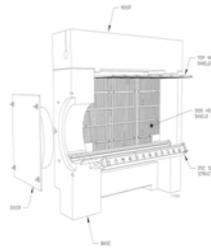
- ▶ DSC Components
 - ▶ Shell Assembly; double redundant welded closures
 - ▶ Basket Assembly
- ▶ Eleven DSC Types
- ▶ Capacity: 24 to 37 FAs (PWR); 52 to 69 FAs (BWR)
- ▶ Heat load: up to 40.8 kW
- ▶ Burnup: Up to 62 GWd/MTU

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NUHOMS® Dry Storage System Components Horizontal Storage Module (HSM)



- ▶ Six HSM Types -- HSM-H shown
- ▶ Heavy reinforced concrete structure
- ▶ Thick roof and walls for shielding
- ▶ Self shielding due to installation configuration
- ▶ Decay heat capacity up to 40.8 kW
- ▶ High Seismic version for deployment at sites with high peak ground accelerations
- ▶ Passive system; Decay heat removed by convection, conduction and radiation

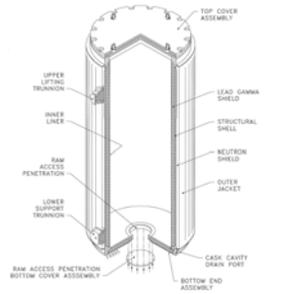
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NUHOMS® Dry Storage System Components Transfer Cask (TC)

- ▶ Four Models; all with similar design features
 - ◆ Cask Structural Shell Assembly
 - ◆ Bolted Top Cover Plate
 - ◆ Upper Lifting Trunnions
 - ◆ Lower Support Trunnions
 - ◆ Lead Gamma Shielding
 - ◆ Inner Liner
 - ◆ Outer Jacket
 - ◆ Neutron Shielding (Water or Solid)
 - ◆ Ram Access Penetration Cover Plate



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The CoC Renewal Application–The Challenges

- ▶ First Active CoC Renewal Application
- ▶ Over 500 NUHOMS® systems deployed at 18 ISFSIs in the US
- ▶ Thirteen amendments (one in progress)
- ▶ SRP NUREG-1927 review guidance:
 - ◆ Developed based on Part 50 plant license renewals
 - ◆ Tested on Part 72 site-specific licenses renewals
 - ◆ Guidance should be revised/augmented to address/encompass:
 - Lead Canister Inspections in the context of CoC renewals
 - Emergent issues (e.g., Chloride-Induced Stress Corrosion Cracking--CISCC)
 - Storage of High Burnup (HBU) Fuel

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The CoC Renewal Application Lead Canister Inspections (LCIs)

- ▶ NUREG 1927 Appendix E, on the subject of "lead canister" inspections appears to be specific to license renewals:
"This inspection is expected to be performed before submittal of the license renewal application. The inspection results become part of the justification for license renewal"
- ▶ NUREG 1927 Appendix E has no guidance on lead canister inspections for CoC renewals
- ▶ The CoC holder does not have authority to require general licensees to perform inspections outside of the conditions of the CoC
- ▶ The storage system under a CoC consists of multiple designs deployed at multiple sites, with different environmental conditions

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The CoC Renewal Application Lead Canister Inspections (LCIs)

- ▶ Offered suggested changes to NUREG 1927 Appendix E through NEI license/CoC renewal working group
- ▶ Provisions to perform LCIs will be included in the CoC renewal application
 - ▶ Require GL to perform LCIs prior to the time the associated HSM/DSC systems enter their period of extended operation or to document justification that a bounding inspection has occurred
 - ▶ Provisions for cases where a timely-submitted CoC renewal application is under NRC review.
- ▶ The CoC renewal application aging management programs will use operational experience (OE) input from:
 - ▶ CoC 1004 User's and internal OE information (CARs, NCRs)
 - ▶ Similar NUHOMS® system inspections performed for specific license renewals
 - ▶ Other available operational experience (other NUHOMS® OE, NRC INS, etc.), and
 - ▶ Generic NRC and industry research information

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The CoC Renewal Application— Emergent Issues—CISCC

- ▶ Extensive literature search, active participation in industry groups, and internal evaluations/analysis/research work in order to :
 - ▶ Establish criteria (critical conditions) for CISCC initiation
 - ▶ Develop technical basis to determine time required for CISCC to affect DSC confinement function and retrievability
 - ▶ Develop basis to be used by GLs for applicability determination
- ▶ Development of CISCC-specific Aging Management Program
 - ▶ Inspection intervals and inspection canister locations
 - ▶ Addresses marine and non-marine sources of chlorides
 - ▶ Provides for collection/ monitoring of site specific airborne chlorides concentration data
 - ▶ Commitment to update/adjust AMP and associated TLAA's to reflect new information
- ▶ Defense-in-Depth Evaluations

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The CoC Renewal Application— Storage of HBU Fuel

- ▶ Extensive research over the last 10 years indicates that HBU fuel can be safely stored beyond the initial 20 years
- ▶ DOE Demonstration Program undertaking to confirm body of research on HBU fuel
 - ▶ AREVA TN is team member
- ▶ Recent testing of different claddings to address embrittlement and ductile-to-brittle transition temperature (DBTT) concerns
- ▶ AMP based on surrogate program. Guidance is needed on how to use information from the DOE program
- ▶ Commitment to continuously update TLAAs and AMP as new data becomes available

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The CoC Renewal Application— AMP Development Highlights

- ▶ AMP Structure Development
 - ▶ Based on the 10 elements of NUREG 1927 and consistent with 10 CFR Part 50 License Renewals
 - ▶ Scope of Program,
 - ▶ Preventive Actions,
 - ▶ Parameters Monitored or Inspected,
 - ▶ Detection of Aging Effects,
 - ▶ Monitoring and Trending,
 - ▶ Acceptance Criteria,
 - ▶ Corrective Actions, Confirmation Process, Administrative Controls,
 - ▶ Operating Experience
 - ▶ Monitoring Inspections based on ASME Section XI and GALL Report to the extent possible/practical (e.g., GALL XI.S6 "Structures Monitoring" is basis for HSM AMP; XI.S1 ASME Section XI, Subsection IWE is basis for DSC AMP) and other industry codes/standards/reports (ACI, ASTM, NUREGs, EPRI)

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The CoC Renewal Application— AMP Development Highlights

- ▶ AMP Structure Development (Continued)
 - ▶ Allow for integration into general licensee (GL) 10 CFR Part 50 Appendix B processes
 - ▶ Allows for close CoC holder/ GL interaction for effective implementation of AMP
 - ▶ Allows for continuous integration of operating experience, research, monitoring, and inspection results – "Learning" AMPs
 - ▶ Establishes GL commitments as part of CoC renewal

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**The CoC Renewal Application—
Conclusions**

- ▶ GLs to perform LCIs (or justify that a bounding inspection has occurred) as part of their systems extended operation aging management activities - Appendix E revision
- ▶ Emergent issues are addressed in a bounding manner
- ▶ Commitment to update TLAA's and AMPs as new information becomes available, as a condition of CoC renewal—Learning AMPs

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