

Learning Aging Management for Dry Cask Storage

The Role of NEI 14-03

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Topics to Address

- Foundation
- Structure
- NEI 14-03
 - Construction
 - Function
 - Alignment
- Path Forward



Foundation

- Dry Casks are robust systems with no moving parts
- 72.42/72.240 rulemaking
 - Increased license/CoC renewal terms from 20 to 40 years
 - “This increase is consistent with the NRC staff’s findings regarding the safety of spent fuel storage as documented in the renewal exemptions issued to the Surry and H.B. Robinson ISFSIs” 76 Fed. Reg. 8874 2/16/2011
- Continued Storage rulemaking
 - “continued safe storage of spent fuel in dry casks for the timeframes considered in the GEIS is technically feasible” NUREG-2157, September 2014
- EPRI and NRC Dry Storage PRAs conducted in 2007
 - Annual cancer risk between $1.8E-12$ and $3.2E-14$ *
- Opportunities to verify performance being aggressively pursued

* Compares to $2E-6$ LCF/yr. public & $1E-5$ LCF/yr. worker thresholds of negligible risk from NRC’s framework for “Risk-Informed Decision-making for Nuclear Material and Waste Applications”, Revision 1, February 2008

Structure

Learning Aging Management

Stable and Predictable Regulatory Framework

NRC Requirements
& Guidance

- 10 CFR 72
- NUREG 1927

Sound Scientific &
Technical Inputs

- MAPS Report
- EPRI Reports

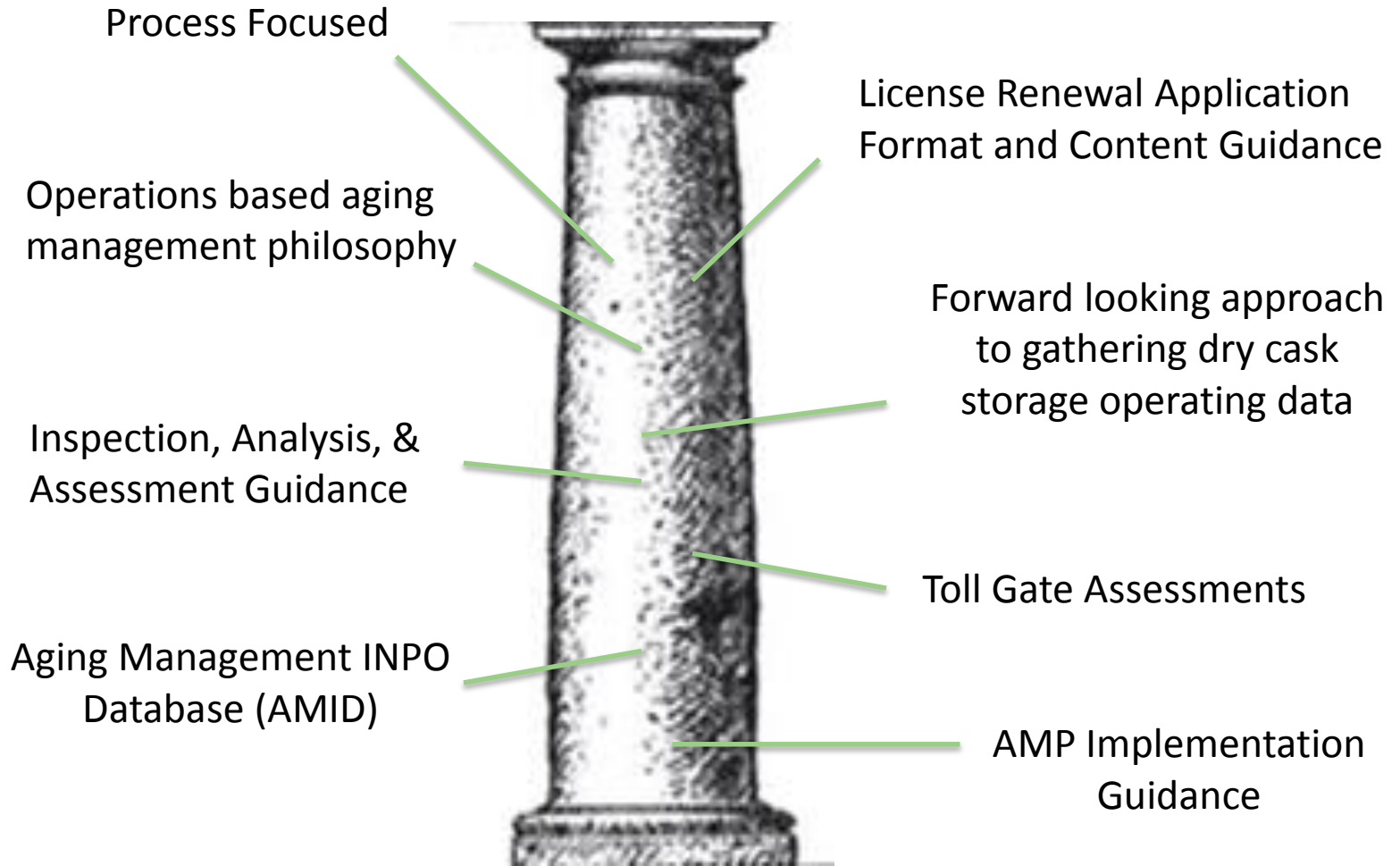
Consensus Codes &
Standards
(Under
Construction)

Industry Practices
& Guidance

- NEI 14-03

Robust Dry Storage System Design

NEI 14-03 - Construction

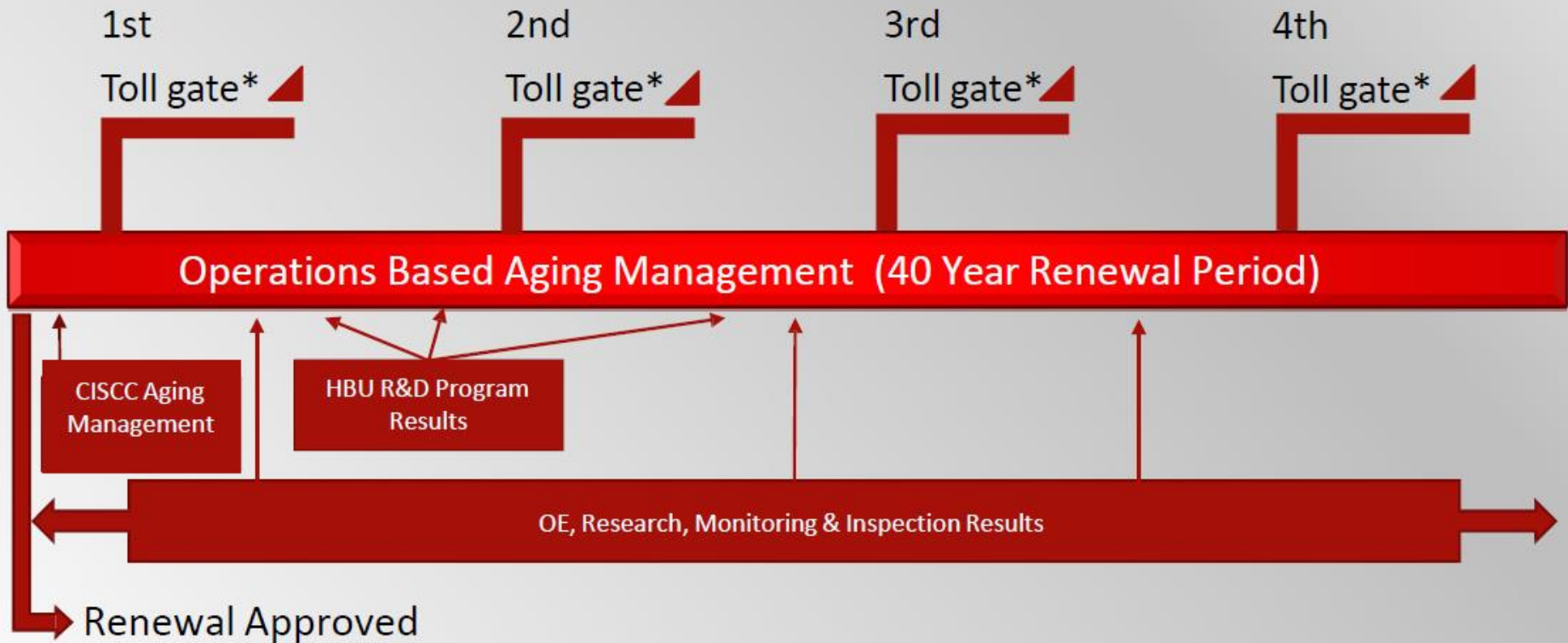


Function – Toll Gates



- Commitment to periodic, documented safety assessments
- Assessment timing specified after renewed operating period begins determined by the specific licensee or CoC holder
- Integrates OE, research, monitoring, and inspection results and assesses aggregate impact (e.g. applies CISCC susceptibility criteria & HBU R&D results)
 - If confirmatory, proceed to next toll gate (no action)
 - If not, pre-plan for possible outcomes – e.g., implement corrective actions, if needed, under licensee’s corrective action program
- Piloted in Calvert Cliffs, Prairie Island, and AREVA-TN CoC 1004 renewals tailored for specific issues – Canister corrosion, high burnup fuel

Function – Toll Gates for ISFSI License Renewal



* To be determined by specific licensee/CoC Holder (with cask user input)

Function – Operating Experience



- Identification, screening, and sharing of OE within and across DCS technologies is a key
- OE should be screened consistently and shared among affected entities in a timely manner
- Industry has created the Aging Management INPO database to facilitate effective OE sharing
 - Enhancement of cask vendors existing program to capture and disseminate aging-related OE
 - Will capture both positive and negative OE
 - Utilize existing plant operating experience sharing infrastructure for dry cask storage

Alignment

Lead System Inspections



- Industry agrees with NRC that clarity is needed with respect to scope and purpose of inspections that pertain to license and CoC renewal.
- NEI 14-03 has been revised to replace “lead system inspection” with 3 more specific terms
 - Pre-application inspection
 - Baseline inspection
 - Lead component
- Initial inspections (and TLAAs) will provide operating experience basis to inform need for additional inspections at each site.
- EPRI Susceptibility Report provides criteria and ranking for use of surrogate inspections for SCC.

Alignment

Licensee Implementation



- Key concept:

Effective licensee implementation of an operations-based DCS aging management program will require the ability to efficiently change AMAs based on feedback from operating experience, research, monitoring, and inspections

An overreliance on the use of license and CoC conditions encumbers the implementation of AMPs in a way that is fundamentally counterproductive to a truly learning approach to aging management

Alignment

Change Control/Tech Spec Content



- Placing aging management program in license conditions is inconsistent with PRM 72-7 and NRC risk informed framework initiative.
- Emphasis has been on ensuring licensee/CoC holder control of dry cask storage AMPs is consistent with plant license renewal.
- To remain a “learning aging management” program need to ensure that flexibility exists to modify or update the AMPs in a timely manner.
- Underlying QA program requires maintenance of the design basis (and restoration of the design basis, if needed).

Alignment

Change Control/Tech Spec Content



- CoC amendments require rulemaking and are not an efficient change mechanism
 - Later amendments are not applicable to casks loaded under the renewed original CoC or earlier amendments
- Level of detail in recent renewed site-specific ISFSI licenses may hinder ability to be responsive (CoC holders do not have the ability to quickly modify the program if in the CoC).

Path Forward

- NEI 14-03 Revision 1 submitted to NRC 9/24/2015
 - Responsive to NRC comments received 1/21/2015
 - Designed to work in conjunction with NRC's proposed Revision 1 to NUREG 1927 (7/7/2015)
 - Consistent with NEI comments on NUREG 1927 (8/21/2015)
- In finalizing NUREG 1927, Rev. 1, NRC should seek public comments on NEI 14-03, Rev. 1
- Final NUREG 1927 should address endorsement of NEI 14-03
- Industry and NRC programs must be consistent

Long Term Safety

Learning Aging Management

Stable and Predictable Regulatory Framework

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Robust Dry Storage System Design

Abbreviations

- AMA – Aging Management Activity
- AMP – Aging Management Program
- CAP – Corrective Action Program
- CISCC – Chloride-Induced Stress Corrosion Cracking
- CoC – Certificate of Compliance
- DCS – Dry Cask Storage
- HBU R&D – DOE/EPRI Demonstration Project
- OE – Operating Experience
- MAPS – Managing Aging Programs for Storage
- PRA – Probabilistic Risk Analysis
- TLAA – Time-Limited Aging Analysis