How Implementation of PRM 72-7 Will Improve Safety

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NEI

2015 REGCON

November 18th, 2015 • Rockville, MD

PRM 72-7 Vision

- Standardize Dry Storage Licenses
  - CoC/Tech Spec Format and Content
  - Level of Detail
  - Consistency with Commission Policy Statement on Improved TS
- Achieve Appropriate Risk Prioritization in Dry Storage Licensing
- Place information appropriately under licensee control
- Extend Back-fit Rule to CoC holders
- Make specific changes to the regulations to improve efficiency

Criteria for Format and Content of Tech Spec

Tech Spec Limiting Condition for operation of the ISFSI facility or cask is established for each item meeting one of the following:

- *Criterion 1:* Installed instrumentation that is used to detect, and indicate a significant abnormal degradation of the cask confinement boundary.
- *Criterion 2:* An initial condition of a design basis accident that either assumes the failure of or presents a challenge to the integrity of a fission product barrier
- *Criterion 3:* A structure, system, or component which operating experience or risk considerations have been shown to be significant to public health and safety

Criteria for Format and Content of Tech Spec

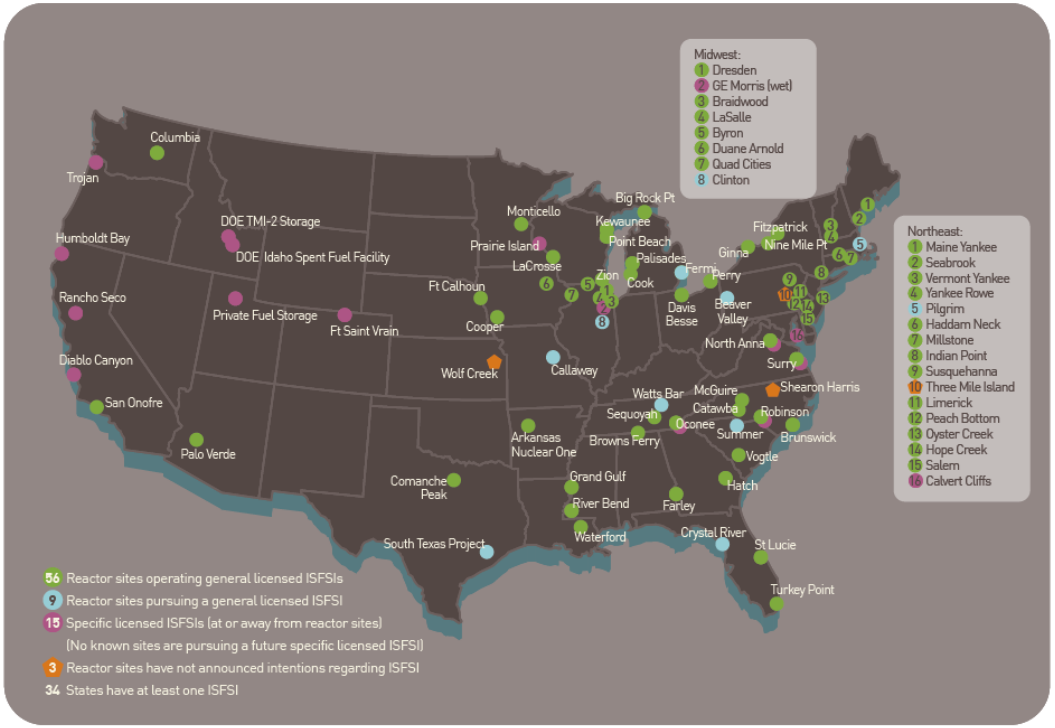
Approved Contents:

- *Criterion 1:* The criteria or parameter is defined in 10 CFR 72.236(a)
  - 10 CFR 72.236(a): type of spent fuel (PWR, BWR, both), maximum enrichment, burnup, minimum cooling time, max heat load, max loading limit, condition of fuel, inert atmosphere
- *Criterion 2:* A characteristic or parameter for which verification is a necessary condition to provide reasonable assurance that the cask safety functions of confinement, sub-criticality, and shielding will be performed.
- *Criterion 3:* A characteristic or parameter which operating experience or risk considerations have been shown to be significant to ensure public health and safety

Used Nuclear Fuel in Storage in the U.S.

July 2015

- Used fuel inventory
  - Approximately 74,000 MTU
  - Increases 2 - 2.4k MTU annually
- ISFSI* storage
  - 83,281 assemblies
  - 23,000 MTU
  - 2,159 casks/modules loaded
  - 67 Operating ISFSIs
    - 1 pool ISFSI, 1 modular vault
- Projections for 2020
  - Estimating 88,000 MTU total
  - Estimating 31,000 MTU at ISFSI
  - 3,250 casks/modules loaded
  - At 76 ISFSIs
    - All plant sites + Morris & INEL
  - Fuel from 119 reactors



- ISFSI Storage will have long-term use
  - DOE projects consolidated storage 2021-2025, repository 2048

*ISFSI = Independent Spent Fuel Storage Installation

Dry Storage Licenses and Amendments

- 15 Active Site Specific Licenses
  - Covering 13 actual and 2 proposed ISFSIs
  - 4 of these ISFSIs are now loading under General Licenses
- 14 Active CoCs
  - Being used under General Licenses
  - These CoCs have been amended 54 times
  - One CoC has been amended 13 times
  - Because the original or any amendment may be used, there are 70 different cask licensing bases in effect

Dry Storage License Renewal

CASK MODEL/CoC	CoC EXPIRATION	CASK USERS
VSC-24	2013**	Palisades, ANO, Point Beach
Standardized NUHOMS/1004	2015	Nine Mile, Ginna, Millstone, Limerick, Oyster Creek, Davis-Besse, Robinson, Brunswick, Oconee, Crystal River, Beaver Valley, Susquehanna, Duane Arnold, Fort Calhoun, Cooper, Monticello, Kewaunee, Palisades, Point Beach,
HI-STAR/1008	2019	Dresden, Hatch
NAC-MPC/1025	2020	Yankee-Rowe, Connecticut Yankee, LaCrosse
HI-STORM/1014	2020	Vermont Yankee, Pilgrim, FitzPatrick, Cook, Fermi, Indian Point, Perry, Dresden, Byron, Braidwood, LaSalle, Quad Cities, Clinton, Columbia, Salem, Hope Creek, Comanche Peak, Palisades, ANO, Grand Gulf, River Bend, Waterford, Hatch, Farley, Vogtle, Sequoyah, Browns Ferry
NAC-UMS/1015	2020	Maine Yankee, McGuire, Catawba, Palo Verde
TN-68/1027	2020	Peach Bottom
TN-32/1021	2020	McGuire
FuelSolutions/1026	2021	Big Rock Point
Advanced NUHOMS/1029	2023	San Onofre
NUHOMS HD/1030	2027	Seabrook, Surry, North Anna, St. Lucie, Turkey Point
MAGNASTOR/1031	2029	McGuire, Catawba, Zion
HI-STORM FW/1032	2031	Sequoyah, Summer, South Texas, Palisades
UMAX/1040	2034	Callaway/SONGS

Site Specific Licenses

Constellation/Calvert Cliffs	2012*
Xcel Energy/Prairie Island	2013**
Dominion/North Anna	2018
PGE/Trojan	2019
SMUD/Rancho Seco	2020
PG&E/Diablo Canyon	2024
PG&E/Humboldt Bay	2025

*Renewed in 2014 to 2052

** Renewal under review

Risk-Informed Perspective

- Risk-informed perspectives and risk analysis continually show low risks
  - EPRI and NRC Dry Storage PRAs conducted in 2007
  - Annual cancer risk between 1.8E-12 and 3.2E-14 *

High Burnup Fuel is Likely NOT Brittle

- Fuel and cask/canister internals issue: "significant" fuel geometric rearrangement?
  UNLIKELY EVEN FOR ACCIDENT CONDITIONS

Radionuclide release (if any) due to loss of confinement is a slow, low health consequence process

* 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

Keys to Assuring Safety with Information Appropriately Under Licensee Control

- 10 CFR 72.48 Change Process
  - NRC and Industry must have confidence in a common understanding of process
    - Industry submitted 72.48 guidance (NEI 12-04) in September 2012 to supersede guidance in NEI 96-07, Appendix B once endorsed.
- Aging Management Programs
- NRC Inspection Programs

Summary

- There are significant and timely opportunities to create efficiencies in dry storage licensing by implementing a risk-informed basis.
- Efficient dry storage licensing processes are essential for effective management of the growing and aging dry storage cask population
- PRM 72-7 is fundamental to the regulatory reform needed to assure an effective and consistent industry approach.