Regulatory Issue Resolution Protocol (RIRP) for Graded Approach to Dry Spent Fuel Storage Licensing

NRC Meeting

Brian Gutherman

for the

Nuclear Energy Institute

Rockville, MD • March 24, 2017

Basis for RIRP I-16-01

- Both NRC and industry recognize that there is a need to improve the efficiency of the licensing process for dry storage of spent nuclear fuel (SNF) under 10 CFR Part 72.
- The process continues to consume an inordinate amount of both NRC and industry resources.
- The level of detail in ISFSI licenses and cask CoCs is not commensurate with dry cask storage risk
- NRC and industry are applying the dry storage regulatory issue resolution protocol (RIRP) to provide risk appropriate criteria for determining the content of ISFSI licenses and CoCs

Used Fuel Storage and Transportation Regulatory Issue Resolution Protocol Number: I-16-01

Improving the efficiency of the regulatory framework for dry storage of used nuclear fuel

- NRC and industry interact in public meetings and letters
  - Establish a structured process for determining what information should be in ISFSI licenses or CoCs, including Tech. Specs.
  - Implement one or more pilot CoC amendments using preliminary CoC format, content and selection criteria agreed to between NRC and industry
  - Utilize lessons learned from pilot(s) to finalize CoC format, content and selection criteria
  - NEI develops guidance for NRC submittal and endorsement in the Standard Review Plans for licenses and cask CoCs

The Efficiency Improvement

- Industry has developed criteria for ISFSI license and CoC content
  - Based on those proposed in 2012 petition for rulemaking (PRM 72-7)
- Criteria based on principles from the power reactor Improved Technical Specification NRC Policy Statement of 1993
  - ITS has been a significant factor in improving operating reactor safety and efficiency since
- Places change control for ISFSI and cask designs in the correct domain, based on safety significance
- Important premise is that information in the ISFSI or cask FSAR is part of the licensing basis and must be complied with (i.e., the FSAR is an enforceable document)

Actions To Date

- Public Meeting Kick-Off for RIRP issue resolution-8/8/2016
- Public Meeting to discuss proposed format, content and selection criteria for the graded approach and pilot-10/28/2016
- NRC/Industry Public Workshop to discuss preliminary license/CoC format, content and selection criteria for the graded approach for dry cask storage pilot-11/21/2016
- NEI letter to NRC clarifying the RIRP approach – 1/12/17

Proposed Pilot CoC Amendment

- Review each existing CoC condition and TS requirement against the PRM format and content
- Any "yes" determination is tentatively retained in the CoC/TS
  - Could be re-located within the CoC or TS based on format for information in the document
- Confirm the above conclusion for each retained or re-located condition or TS using risk insights:
  - No significant increase in the probability or consequences of an accident previously evaluated
  - No possibility of a new or different kind of accident being created compared to those previously evaluated
  - No significant reduction in margin of safety

Proposed CoC Format

- CoC Body - Certified Design
  - Technology
  - Design Features
- CoC Appendix A - Inspections, Tests, and Evaluations
- CoC Appendix B – Technical Specifications
  - Section 1 - Definitions, Use and Application
  - Section 2 - Approved Contents
  - Section 3 - Limiting Conditions for Operation (LCOs) and Surveillance Requirements (SRs)
  - Section 4 - Administrative Controls

Certified Design

- Replaces information in the body of the CoC
- Technology
  - Concise description of dry storage system
- Design Features
  - Those that would have a significant effect on safety if modified, such as some materials of construction or geometric arrangement
- CoC holder has compliance responsibility

Inspections, Tests and Evaluations

- CoC Appendix A
- When performed and the acceptance criteria are met, a cask will operate in conformance with the certified design and fulfill its required safety functions
- Compliance demonstrated by CoC holder or general licensee as specified in the ITE

Technical Specifications

- CoC Appendix B
- Section 1: Definitions, Use and Application
- Section 2: Approved Contents
  - Parameters that if modified would have a significant effect on safety
  - Selection Criteria 1 through 3
- Section 3: Limiting Conditions for Operation (LCOs) and Surveillance Requirements
  - Lowest functional capability or performance levels of equipment required for safe operation of the ISFSI facility and cask
  - Selection Criteria 4 through 6
- Section 4: Administrative Controls

CoC Appendix B, TS Section 1

- Definitions
- Use and Application
- Administrative rules on how to use the TS
- Essentially the same as the information currently in TS Section 1

CoC Appendix B, TS Section 2

- Approved Contents Selection Criteria
- Criterion 1. The characteristic or parameter is identified in 10 CFR 72.236(a);
- 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 that has a significant impact on public health and safety, based on risk insights and expert knowledge.

CoC Appendix B, TS Section 3

- LCO Selection Criteria
- 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 that has a significant impact on public health and safety, based on risk insights and expert knowledge.

CoC Appendix B, Section 4

- Administrative Controls
- High level description of required programs
- Includes essential elements of the programs are required to assure safe ISFSI operation
- Details included in implementing procedures

CoC 1004 Example 1

- Condition 3 is a description of the NUHOMS and currently occupies a page and a half.
- The condition would be retained as the description of the storage technology in the "Certified Design" section of the CoC
- The page and a half would be condensed to a succinct description of the system and the authorized component models

CoC 1004 Example 1

The Standardized NUHOMs System is a horizontal, canister-based, naturally ventilated, dry spent fuel storage system. The Standardized NUHOMS System is comprised of the Dry Shielded Canister (DSC) and Horizontal Storage Module (HSM). A Transfer Cask (TC) is also used to facilitate wet loading of spent fuel into the DSC, preparation of the DSC for storage operation, and transfer of the DSC into and out of the HSM.

The following DSC models are authorized for use in the Standardized NUHOMS System:

- 24P
- 52B
- 61BT
- 32PT
- 24PHB
- 24PTH
- 32PTH1
- 37PTH
- 61BTH (Types 1 and 2)
- 69BTH

Similar lists of HSM and TC models would be included

CoC 1004, Example 2

- Condition 4 currently states: “Notification of fabrication schedules shall be made in accordance with the requirements of 10 CFR 72.232(d).”
- Condition 4 would be eliminated from the CoC and not relocated because it simply cites a regulation that stands alone

CoC 1004, Example 3

- Condition 8 specifies the elements of pre-operational testing and dry run training exercises before first use by each licensee
- TS 5.2.2 contains specific elements of the training program
- These requirements would be re-located from the CoC to the FSAR
- A training program is required to comply with §72.190 and the general QA requirement to ensure personnel are qualified
- The specifics of classroom and dry run training are adequately controlled by the licensee's training program and subject to NRC inspection
- Training requirements relocated to the FSAR do not increase the frequency of and accident, create a new accident of decrease the DSS safety margin

CoC 1004, Example 4

- LCO 3.1.1 specified that helium shall be used for DSC drainage and specifies a drying pressure/hold time
- This LCO would be retained as-is in its entirety
- Risk insights and expert knowledge tell us that dryness and a helium environment inside the DSC are important to protect the cladding against gross rupture
- Meets LCO selection criterion 3
- A DSC not adequately dried or use of air for draining may introduce a new accident and/or reduce the margin of safety

CoC 1004, Example 5

- Design Feature 4.3.3.3 specifies a maximum ambient temperature
- This limit would be retained but re-defined as an LCO and relocated to CoC Appendix B, Section 3
- Meets LCO selection criterion 2 as an initial condition for an accident (blocked vent).

CoC 1004, Example 6

- TS 5.2.4 specifies numerous requirements for the licensees' radiation protection program
- TS 5.2.4 would be significantly condensed to reflect only the key elements of the radiation protection program in Administrative Controls section of TS
- Details of compliance with 10 CFR 20, 72.104, and ALARA would be removed as requirements already specified in the rules themselves

Future Actions

- Industry issues letter to NRC confirming today's graded approach to the pilot exercise – April 2017
- Industry submit a pilot CoC amendment application to NRC implementing the proposed format and content-June 2017
- NRC complete safety review of pilot CoC amendment application- January 2018
- Public meeting to discuss lessons learned from the pilot – February 2018
- NRC complete rulemaking to make CoC amendment effective- June 2018
- Industry develop guidance reflecting the pilot and submit for NRC endorsement as part of standard review plan

Conclusions

- Economic challenges and resource constraints demand a more efficient approach to dry cask licensing
- Based on years of experience, and what is known about the relatively low risks of dry cask storage – there is a significant opportunity to attain a more efficient process
- Industry and NRC are committed to working together to achieve this goal

Questions?