Prairie Island Nuclear Generating Plant

Proposed Cask Design/Technology Change

Summary of Proposed Change

- Xcel Energy proposes to allow a different cask design to be used at the Prairie Island Nuclear Plant for loading of future spent fuel casks (last 9)
  - Approval of this change is through the State of Minnesota via a Certificate of Need granted by the MN PUC
- Different cask designs are available & widely used in the industry that result in options to move fuel offsite at the earliest possible date
- All designs being considered are approved and Certified by the Nuclear Regulatory Commission (NRC) and meet the same rigid safety standards
- Change would NOT impact existing operating licenses of two units

Why the Change?

- Capacity of other cask designs, such as canister-based, have increased over time
- Canister-based designs have become industry standard
  - Over 3,000 canister-based systems in use today, including the Xcel Energy Monticello Nuclear Plant
- Proposed Central Interim Storage Facilities' initial license applications would initially only accept canister-based design casks
- Bolted lid casks (currently used at Prairie Island) have increased in cost relative to other designs such as canister-based; Prairie Island is the only site still loading bolted lid casks in USA

Current Dry Storage Design

- TN-40 and TN-40HT Design (TN = Transnuclear, Inc.)
- In use at Prairie Island since 1995; Currently 47 casks
- Bolted steel lid with redundant metallic seals
- Two-layer steel walled cask (over 10 inches thick combined)
- TN-40 model is licensed for transport
- TN40HT transport application submitted in 2021
- Prairie Island licensed for up to 64 casks to support operation to end of current NRC operating licenses for two units (2033, 2034)

Current Cask Technology – TN-40

Proposed: Canister-Based Designs

- These systems are in widespread use throughout the United States and world with over 3,000 in use today, including at Monticello
- Consists of a steel canister with two welded closure lids
- The sealed, steel canisters are placed in a vertical concrete overpack or horizontal concrete vault
- The concrete module portion provides additional radiation shielding and protects the canister from external hazards, similar to the outer steel layer of the TN-40 (and the Prairie Island containment domes)

Proposed: Canister-Based Designs

Vertical Canister System

- Similar appearance to TN-40
- Somewhat wider; concrete vs metal exterior
- Over 2,200 in use

Horizontal Canister System

- System in use at Monticello
- Over 1,200 in use

Current Cask Design vs. Proposed Design

	TN-40 (current)	Proposed Systems
Fuel Confinement	Steel shell	Steel shell
Sealing	Bolted lid with two metal o-rings	Two welded steel lids
Shielding/ Protection from Hazards	Outer steel layer	Reinforced concrete
Storage License	NRC Part 72	NRC Part 72
Transport License	NRC Part 71	NRC Part 71

Canister Loading Process

- Process similar to existing casks, except that lids are welded vs bolted
- A steel "transfer cask" is used to handle the canister during loading operations in the plant
- Loaded, sealed canister is then transferred to final configuration
- Transfer cask performs same function as TN-40 outer shell
  - Trunnions for lifting
  - Radiation shielding for workers
  - Protection from hazards – Tornadoes, etc.

Monticello Transfer Cask

NRC General Licensing Process for Cask Designs

- Cask designs are Certified by NRC for storage and/or transport
- All designs undergo same lengthy safety review process
- Once Certified, operating reactor sites are licensed to use
- Prior to use, sites must perform an evaluation of the design to ensure their use at the selected site would be consistent with conditions of NRC Certification
- The evaluation is retained and subject to NRC inspection
- 65 reactor sites use General Licensed Cask Designs

State Review Schedule