Information Provided by Xcel Energy to Department of Commerce, Energy Environmental Review and Analysis Staff to Aid Preparation of the Supplemental Environmental Impact Statement for Xcel Energy's Proposed Change in Spent Fuel Storage Technology at the Prairie Island Nuclear Generating Plant

Docket No. E002/CN-08-510

Prairie Island SEIS – Additional Information
July 30, 2021

Good to meet with you this morning. As we discussed, here is my list of topics where I believe we will need additional information to help prepare a supplemental EIS. Please let me know if I've jumbled or missed something.

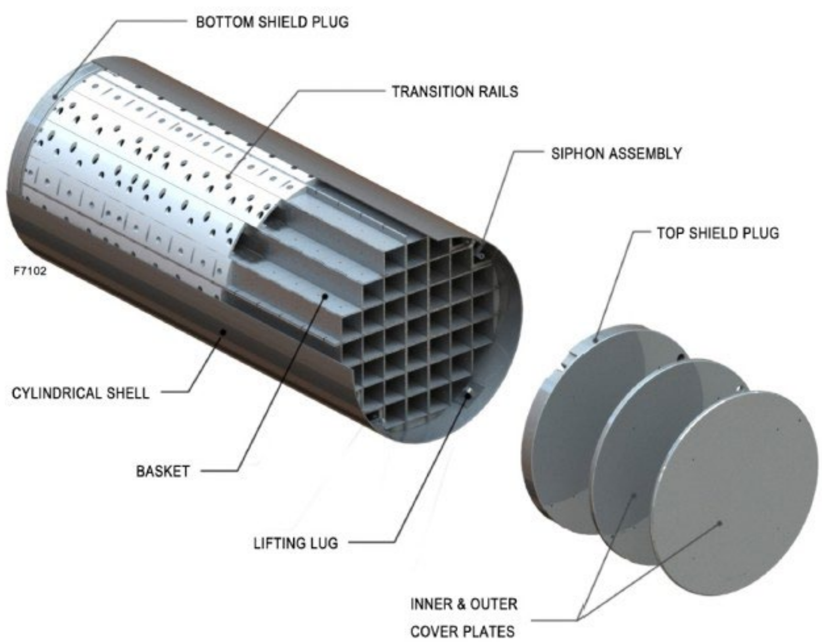
- A description of welded casks and concrete overpack(s). How are they the same as / different from TN-40 cask? Pictures helpful. Discuss cask options; use Monticello casks as an example.

  Metal casks such as the TN-40 and canister-based systems are similar in that they both store fuel in a dry, inert steel container. The casks are steel cylinders that are either welded (canister-based) or bolted (metal casks) closed. The steel cylinder provides a leak-tight confinement of the spent fuel. Each cylinder is surrounded by additional steel, concrete, or other material to provide radiation shielding to workers and members of the public. Some of the cask designs can be used for both storage and transportation.

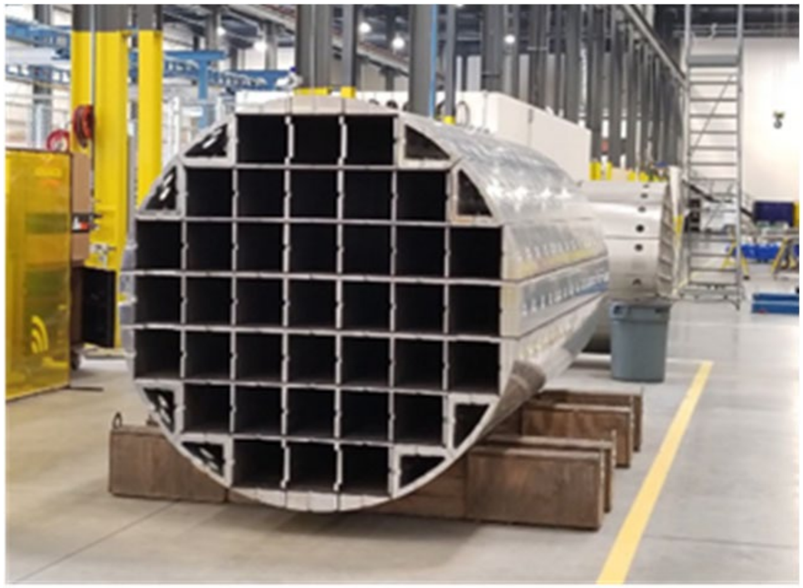
  All casks provide both confinement and shielding on the spent fuel assemblies. Confinement provides and inert atmosphere (typically helium) to ensure the spent fuel is protected during storage against long term degradation. Shielding is provided to reduce radiation exposure to workers and the general public. A metal cask such as the TN-40 uses a thick-walled steel shell (two layers combine for a total 9.5" for the TN-40) for both the confinement and shielding function, and a bolted lid with redundant metallic seals to complete the confinement barrier. Canister-based systems use a thinner steel shell for the confinement function and concrete for the shielding function. Canister systems use two separate lids that are welded closed to complete the confinement barrier.

  Canister systems store the welded canister in either a vertical or horizontal orientation. Vertical storage systems use a thick-walled concrete cylinder to provide radiation shielding. A gap between the canister and concrete overpack is provided to allow airflow for heat removal. Openings in the concrete cylinder at the top and bottom allow natural convection of the air to enhance the cooling. The horizontal design stores the welded canister horizontally in a rectangular storage module. Similar to vertical systems, air ducts are provided to allow natural air convection to provide heat removal.

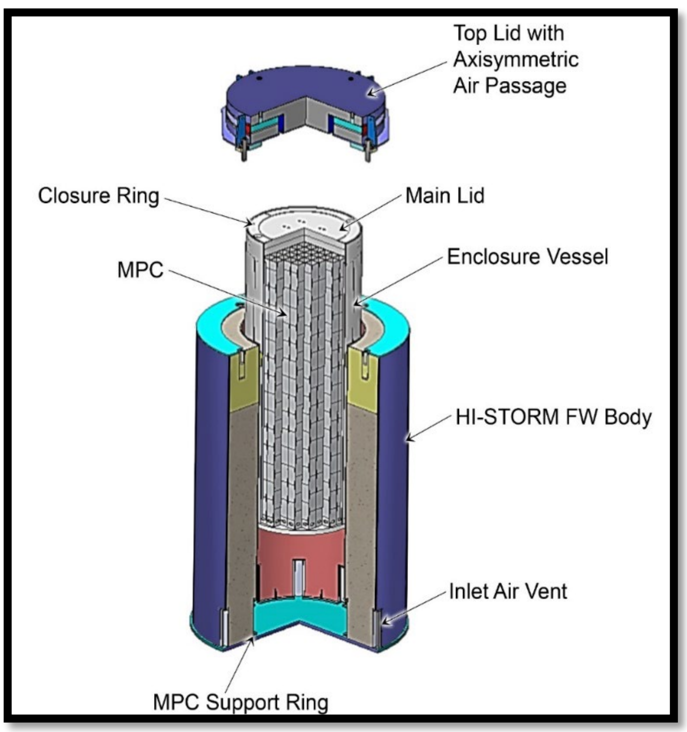
The following three figures illustrate typical canister construction and the Holtec HI-STORM vertical cask components.



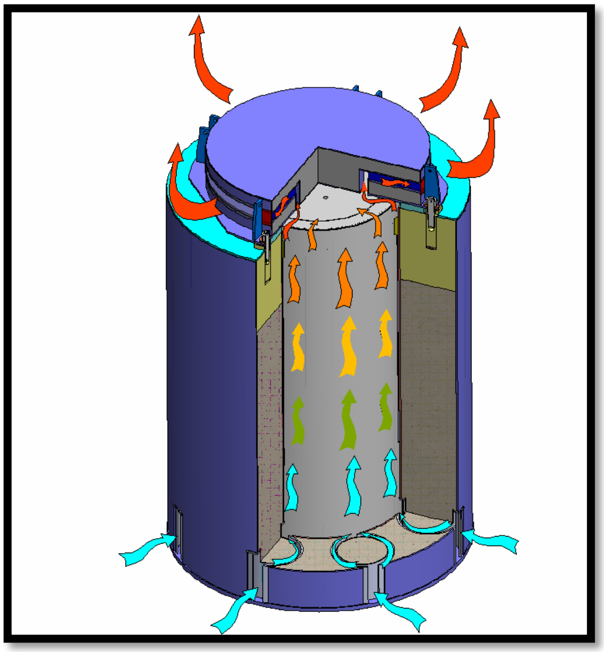
Major Welded Canister Components (Orano EOS)



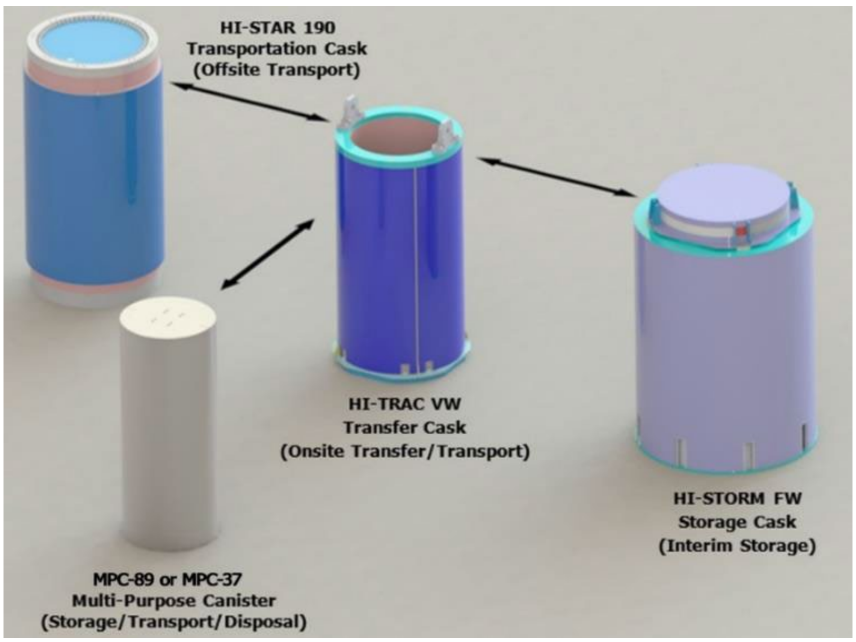
Canister in Production (Orano EOS)



Vertical Cask Storage Configuration (Holtec HI-STORM)

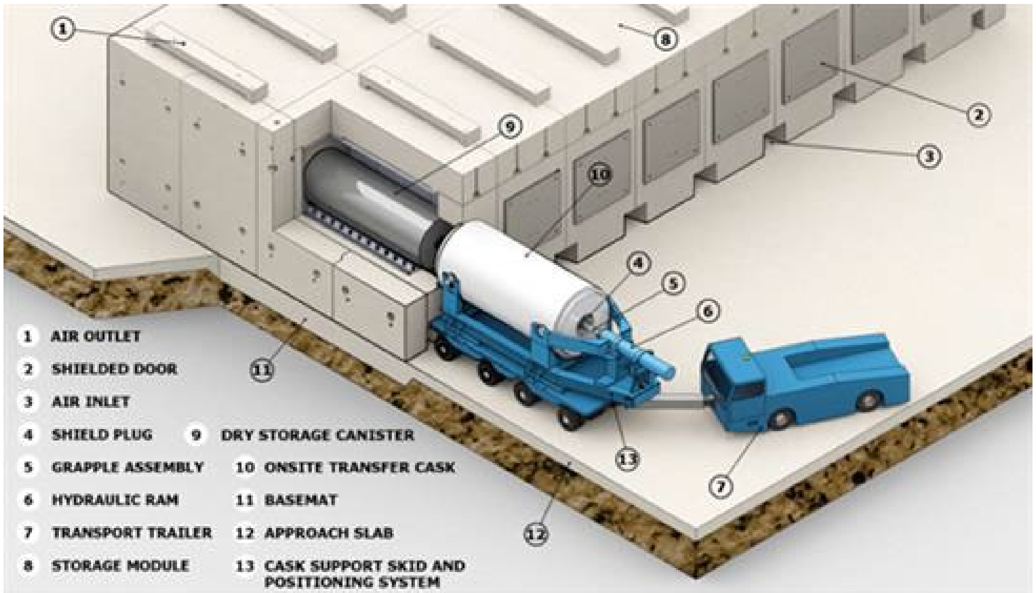


Vertical Cask Air Flow/Heat Removal (Holtec HI-STORM)



Vertical Cask Components (Holtec HI-STORM)

Horizontal storage of canisters has many similarities to vertical, in particular the welded canister designs are alike. The next two figures illustrate the process of placing the welded canister into the horizontal storage module.



Overview of NUHOMS Horizontal Storage System

Alignment of Transfer cask with Opening of Horizontal Storage Module

Operational Description

Operational differences between a metal cask and canister-based system are primarily due to 1) use of a bolted lid (metal casks) vs a welded lid (canister-based) and 2) the need to provide a temporary metal transfer cask for loading of the fuel in the spent fuel pool for canister systems. The concrete shielding used in canister systems can not be used under water in the spent fuel pool because they are too porous and heavy for spent fuel pools for vertical systems, or in the case of horizontal systems the concrete modules are only used at the ISFSI pad and not compatible with spent fuel pools or cranes.

Appendix A provides an overview of the loading process for each, highlighting the similarities and differences. Appendices C-D provides a more detailed description of the loading process for the TN-40 and two most common canister-based systems.

- A description of what would be different at the PI ISFSI – e.g., more concrete aboveground? Any changes to the pad / pad design to support this concrete? Any changes to construction / design / logistics?

The overall footprint of the ISFIS would not change. Any new technology would be housed within the existing fenced area of the facility.

We do not expect any significant differences at the ISFSI, other than the visual difference between the cask technologies. Vertical concrete casks look much like the TN-40 casks, although typically somewhat larger in diameter and grey instead of white in color. The NUHOMS system uses horizontal concrete module to house the welded fuel canisters, so they do look different than the vertical system.

There would be no significant changes to the ISFSI. The concrete pad currently under construction would house the new technology. The approach to the new pad is currently Class 5 gravel. Depending on the system used, the 25 feet leading up to the pad may be converted to a concrete approach.

TN-40 Casks

NUHOMS Modules

Holtec HI-STORM Casks

- A description of changes to cask handling. Welded casks are lighter and have less built-in shielding – how does affect cask handling? What precautions are needed to handle the casks safely (same as current? anything new/different?)

Cask loading in the Spent Fuel Pool (SFP) is largely similar between bolted cask and welded canister systems. When the canisters are moved to the SFP for fuel loading they are placed into a metal Transfer Cask that provides interfaces with the overhead crane and provides radiation shielding when the canister is removed after loading. The Transfer Cask includes a sealing system that prevents SFP water from coming in contact with the exterior surfaces of the canister, thereby preventing any surface contamination that would otherwise need to be removed prior to moving to the ISFSI. Appendices A-D provide a more detailed description of the loading processes.

Precautions during loading are similar when using a canister or bolted cask. Cask movement in and out of the SFP is performed using the overhead Auxiliary Building crane. This crane meets stringent NRC requirement to qualify as "single-failure-proof" that includes several additional safety features over typical cranes designs. Interface points (e.g. trunnions) and lifting beams also meet NRC requirements for movement of heavy loads and spent fuel that are above and beyond standard crane designs.

Radiation shielding on the sides and bottom of a loaded cask is provided by either the metal cask of the metal transfer cask in the case of a canister system. In both cases a thick shielding lid is placed over the fuel before removal form the pool. In the TN-40 bolted cask this is the final lid that is placed underwater, in a bolted design it is the inner shielding lid that is welded in place after removal from the pool. Temporary shielding of specific areas is provided as needed in all cases to reduce worker exposure during the sealing and testing operations.

- An estimate of the radiological dose rate at the nearest PI residence. A ballpark estimate; can be based on Monticello casks. Welded casks similar to the TN-40s? About the same for the ISFSI as a whole since most casks on the pad will be TN-40s?

All designs meet the same NRC requirement for radiation dose rates to workers and the general public. Worker exposure during loading is a function of both the worker-hours needed to prepare the casks and the nature of the fuel contained in the cask. Fuel that has been in the reactor longer and has a shorter decay time since being discharged has a larger radiation source than less used fuel that has decayed longer.

While all designs must meet the same NRC requirements, specific dose values to offsite individual cannot be determined until a final design has been selected. However, a relative dose rate calculation to the nearest resident has been performed comparing the TN-40 design to the NUHOMS canister design used at Monticello. The calculation compared 9 TN-40 casks to that from 10 NUHOMS canisters (1 more canister is needed for the same amount of fuel based on capacity). The calculation assumed 64 TN-40 casks in in case, and 55 TN-40 casks and 10 NUHOMS canisters in the other. The calculation demonstrates that 10 NUHOMS canisters would result in lower offsite radiation doses than 9 TN-40 casks. As both cases assume 55 TN-40 casks are present in the ISFSI, the overall offsite dose would be expected to be very similar regardless of what design is used for the last increment of storage.

As described in the EIS for the current ISFSI assuming 64 TN-40 casks (PUC Docket E002/CN-08-510) the calculated radiation exposure to the nearest resident from ISFSI operations is 0.4 mrem/year, a level indistinguishable from background levels. This level of 0.4 mrem/year compares to the NRC regulatory limit of 100 mrem/year from all man-made sources and 25 mrem/year from ISFSI operations.

- Any anticipated change to worker radiological exposure or dose? If so, what is the change and why?

Worker radiation exposure is comparable for the various designs. The table below compares the average worker exposure resulting from loading a TN-40 cask and the two most common canister systems, NUHOMS and Holtec HI-STORM. Is should be noted that variations are expected due to the differences in fuel being loaded at each site as it is a function of the fuel type, length of time in the reactor, and time elapsed since the fuel was discharged from the reactor. Although these variations make direct comparison difficult, the data shows that worker exposure is comparable for all three designs and consistent with the concept of maintaining exposures as low as reasonably achievable.

Average Cumulative Worker Exposure During Loading (mrem)			
	TN-40 (1)	NUHOMS (2)	Holtec (3)
Actual	343	608	220

(1) – Average from Prairie Island cask loading
(2) – Average based on Monticello loading data
(3) – Average based on data from 3 sites as provided by vendor

These values are all excellent for operations of this sort, and well within the accepted principle of maintaining dose As-Low-As-Reasonably-Achievable (ALARA). For comparison, the TN-40 Safety Analysis Report (SAR) conservatively assumed a cask loading would result in 2,315 mrem of exposure to the workers involved. The SAR is the document submitted to the NRC that is used to demonstrate that the cask design meets all NRC regulatory requirements.

- What is the regulatory framework for this proposed change in cask technology?
  - What is NRC's role? Will they need to approve cask that is ultimately selected? Do they review/approve all casks

The TN-40 casks are approved for use at Prairie Island under an NRC Site-Specific License. This license is issued to Xcel Energy and does not allow use of the TN-40 at any other location.

A canister system would be Certified for use by the NRC and used at Prairie Island under the NRC General License process. This is the licensing process used for the casks used at Monticello. Each of these licensing processes is described below.

- Site Specific License

  NRC authorizes storage of spent nuclear fuel at an independent spent fuel storage installation (ISFSI) under two licensing options: **site-specific license** and **general license**.

  The TN-40 casks are NRC approved under a Prairie Island **site-specific license**, where an applicant submits a license application to NRC and the NRC performs a technical review of all the safety aspects of the proposed ISFSI. The TN-40 cask was designed specifically for Prairie Island fuel and is used at no other sites in the country. The Prairie Island license contains technical requirements and operating conditions (fuel specifications, cask leak testing, surveillance, and other requirements) for the ISFSI and specifies what fuel is authorized to store at the site. When the Prairie Island License was initially reviewed and approved the general license provision of 10CFR Part 72 did not exist.

- General License

  A **general license** authorizes a nuclear power plant licensee to store spent fuel in NRC-approved casks at a site that is licensed to operate a power reactor under 10 CFR Part 50. This is the process used for the majority of ISFSIs, including the Xcel Energy Monticello site. Licensees are required to perform evaluations of their site to demonstrate that the site is adequate for storing spent fuel in dry casks. These evaluations must show that the cask Certificate of Compliance conditions and technical specifications can be met, including analysis of earthquake events and tornado missiles. The licensee must also review their security program, emergency plan, quality assurance program, training program and radiation protection program, and make any necessary changes to incorporate the ISFSI at its reactor site. No NRC review and approval is required of these evaluations prior to loading, although the are subject to NRC review and inspection.

- Cask Certification Process

  An ISFSI using the NRC general license process will take advantage of an NRC-approved casks design. An NRC-approved cask is one that has undergone a technical review of its safety aspects and been found to be adequate to store spent fuel at a site that has been evaluated by the licensee to meet all of the NRC's requirements in 10 CFR Part 72. The NRC then issues a Certificate of Compliance for a cask design to the cask vendor if the review of the design finds it technically adequate. The cask certificate is valid for up to 40 years from the date of issuance.

<u>For the proposed change in technology, it is the intention of Xcel Energy to use a NRC certified cask under the general license process. As such, no further NRC review and approval will be required prior to the technology change.</u>

- What is the Commission's role?

The Company is requesting Commission approval to utilize any canister-based system previously granted a Certificate of Compliance by the NRC under the general license provisions of 10CFR Part 72. This would be an update to the Certificate of Need issued under Docket E-002/CN-08-510.

- What is happening with the two interim storage sites (New Mexico, Texas)?

Both sites are under active NRC review. A draft EIS has been issued for both, and public meetings have been held. The ISP facility in Texas anticipates NRC approval in 2021, and the NRC has recently issued a proposed schedule for completion of their review of the Holtec facility in New Mexico that anticipates approval in early 2022.

- Has the NRC prepared a generic EIS for spent fuel storage? Please provide a link to this document. Has NRC prepared other relevant spent fuel storage documents? Please provide links to these documents. [Already provided in Monticello EAW email]

Yes. The reference is NUREG-2157, *Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel*

Useful Reference Links

1. Holtec International

Dry Cask Storage and Transportation | Holtec International

2. Orano/TN Americas

Used Fuel Storage (orano.group)

3. NAC .

Storage Technologies | NAC International (nacintl.com)

4. NRC

Storage Of Spent Nuclear Fuel | NRC.gov

Dry Cask Storage | NRC.gov

Dry Spent Fuel Storage Designs: NRC Approved For General Use | NRC.gov

Appendix A – Overview of Loading Operations

Table A-1 provides a basic overview of the loading process if a TN-40 vs a canister-based system. The primary difference is that the TN-40 is loaded in essentially the final configuration, where canister systems use as temporary transfer cask to load fuel in the cask and perform all the lid welding and testing operations. After a canister is full sealed with welding of the lids, it is transferred from the transfer cask to a concrete structure that provides radiation shielding and includes a flow path for air to circulate around the canister for heat removal. For the NUHOMS horizontal system this transfer is performed at the ISFSI. For vertical systems such as Holtec the canister is transferred to the concrete overpack within the plant auxiliary building prior to transfer to the ISFSI.

Table A-1 Comparison of TN-40 vs Canister Loading Operations

	TN-40	**Canister**
Loading in pool	TN-40 cask lowered into SFP and fuel assemblies loaded	Canister placed in a temporary transfer cask and lowered into SFP for loading. Outwardly, the transfer cask looks similar to the TN-40
Lid placement	Final, single piece lid (10.5" thick) placed on cask after fuel loaded while cask in SFP	Inner shielding lid placed on cask after fuel loaded while canister/transfer cask in SFP
Removal from SFP	Cask with final lid removed from pool.	Canister/transfer cask with inner shielding lid removed from SFP
Water removal	Water pumped out of cask as cask removed from pool	Similar process
Lid attachment	Cask lid bolted/ torqued following water removal	Inner shielding lid welded to canister following water removal
Cask drying/ backfill with inert helium gas	Cask placed under vacuum to remove any remaining moisture. Inner cavity then filled with helium	Similar process of drying and backfilling with helium

	gas to provide an inert atmosphere and to enhance heat removal	
Final lid preparation	Covers bolted over access ports used for drying/helium backfill	Cover welded over access port on shielding lid used for vacuum drying/helium back fill
Second lid attachment	A second lid is not required for the TN-40. A 4" disk is attached to the lid to provide addition neutron shielding. A weather cover is then attached over the completed cask lid area.	Second lid welded to canister to provided redundant closure

At this point the TN-40 is in its final configuration and ready to be moved to the storage pad.

The canister system still requires transfer of the welded canister to the final concrete storage configuration. There are two basic types of canister systems, vertical and horizontal. The steps to place the loaded canister into the final configuration are slightly different based on the designs.

Vertical Storage Systems

The sealed canister containing the fuel assemblies is moved from the transfer cask to the vertical concrete overpack in the plant auxiliary building. The transfer cask is placed on top of the concrete overpack using the overhead cask handling crane. The crane is then used to lower the canister from the transfer cask into the concrete overpack after removal of the transfer cask lower lid.

The canister/concrete overpack is then ready for transport to the ISFSI using a special crawler.

Horizontal Storage Systems

The sealed canister containing the fuel assemblies is moved to the ISFSI while still in the transfer cask. The transfer cask is then aligned with the opening of a horizontal storage module. A hydraulic ram is then used to push the canister into the concrete storage module, after which a shielding door is bolted to cover the opening.

Monitoring at the ISFSI

Periodic surveillance of the cask condition and performance is required to ensure the continued safety of the facility. All designs require a radiation monitoring program to verify radiation levels are below regulatory limits and that the radiation shielding does not deteriorate over time. General condition monitoring is also required, as well as security system monitoring.

The TN-40 bolted lid requires monitoring of the overpressure maintained between the two O-ring seals to verify cask seal integrity to ensure the cask's containment boundary is being maintained and to verify there is no seal leakage to the environment. Welded lid designs do not require this type of monitoring, as post weld examination is considered sufficient to ensure the long term integrity of the closure.

Canisters rely on air flow around the canister for cooling and therefore typically require routine monitoring to ensure the airflow is not degraded due to blockage of the inlet or outlet vents. This is accomplished either by routine visual inspection or by continuous monitoring of the duct outlet temperature.

A summary of typical monitoring requirements is provided in Table A-2.

Table A-2 Typical Monitoring Requirements

Parameter	TN-40	Canister
Radiation	TLD are placed at several locations surrounding the facility. This is supplemented by periodic measurements by technicians using hand held instruments.	Similar
Lid	The space between the redundant lid seals is monitored by measuring the pressure of helium gas in a pressure monitoring system connected between the two O-rings.	Welded designs do not contain O-rings that would require monitoring

Thermal Performance Monitoring	No temperature monitoring is required when stored at the ISFSI	Either 1) daily visual inspection of air ducts or 2) duct outlet temperature monitoring is performed to ensure the air flow path remains unblocked
Cask material condition	Periodic assessment of the cask exterior surface to ensure it is free of damage, deterioration, and debris.	Similar

Appendix B – TN-40 Loading Operations

This section provides a description of the fuel loading operations for transferring spent fuel from the pool to the ISFSI, as well as the operational sequence for transporting them off-site.

Canister Loading

Cask loading includes physically placing the fuel assemblies into the cask, draining, decontamination, securing the lid, and drying, and includes the following sequence of events:

1. Stage the cask inside the rail bay of the Auxiliary Building.
2. Lift the empty cask by its lifting lugs and place it vertically in cask decontamination area. (Figure 3-16).

Figure 3-16: Rail Bay Staging

3. Remove the lid and perform the receipt inspections.
4. Engage the lifting yoke with the cask upper trunnions.

5. Lift the cask up to the spent fuel pool.
6. Lower cask into the pool.
7. Load the spent fuel assemblies into the cask.
8. Install the lid underwater.
9. Engage the lifting yoke and lift the cask out of the pool water. (Figure 3-17).

Figure 3-17: Wash Down

10. Drain water from the cask.
11. Wash down the exposed portions of the cask.
12. Move to cask decontamination area. (Figure 3-18).

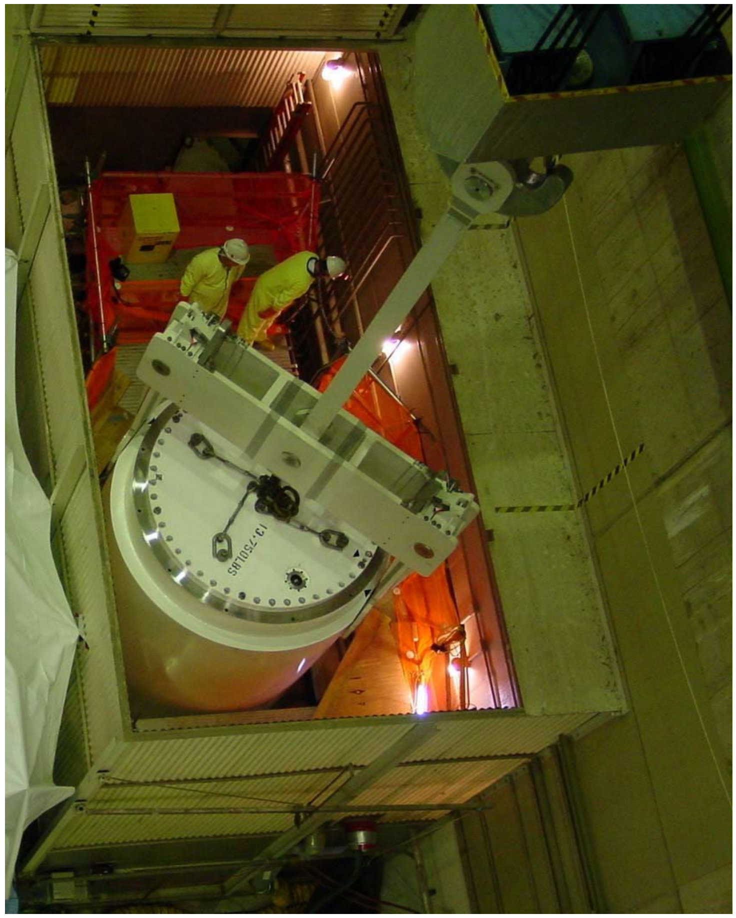


Figure 3-18: Decontamination

13. Decontaminate outer surfaces of cask.
14. Torque lid bolts.
15. Install drain port cover.
16. Connect the vacuum drying system to the vent port.
17. Perform vacuum drying
18. Backfill cask with helium.
19. Install vent port cover.
20. Perform helium leak test of lid seals.

Transport to the ISFSI

Cask transport operations include transferring the loaded cask to the CTV, installing the top neutron shield, transporting the cask/canister to the ISFSI, and connecting the pressure monitoring system. The operations steps include:

1. Engage the lifting yoke with the cask upper trunnions.
2. Place the cask into the CTV.
3. Install top neutron shield drum.
4. Pressurize the overpressure system to approximately 72 psig.
5. Perform leak test on overpressure system.
6. Install protective weather cover.
7. Use the CTV and tow vehicle to transfer the cask to the ISFSI. (Figure 3-19)

Figure 3-19: CTV Transport

8. At the ISFSI, position the cask over the desired pad location.
9. Lower the cask onto the Pad.
10. Rotate the CTV rear wheels to the unloading position. (Figure 3-20)

Figure 3-20: Dry Cask Storage Pad

11. Remove the CTV.

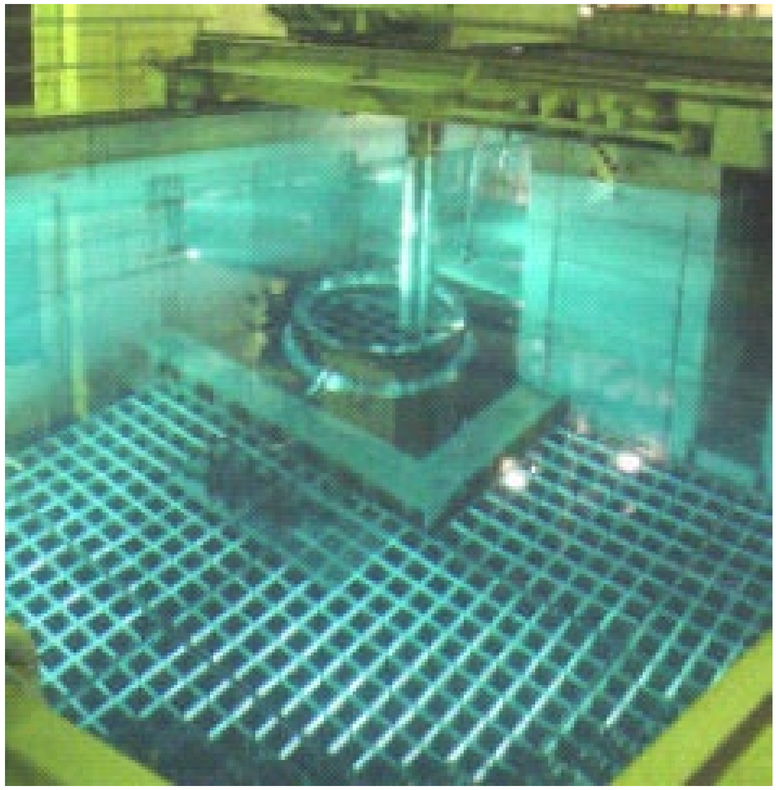
12. Connect the seal pressure monitoring instrumentation.

Appendix C - NUHOMS Loading Operations

Canister Loading

Canister loading includes physically placing the fuel assemblies into the canister, decontamination, draining, drying, and seal-welding, and includes the following sequence of events:

1. Stage the transfer cask and canister inside the truck bay door of the plant.
2. Lift the empty canister by its lifting lugs and place it vertically in the transfer cask.
3. Install the pneumatic seal between the cask and the canister and fill the canister with water.
4. Engage the lifting yoke with the cask upper trunnions.
5. Lift the transfer cask and canister up to the fuel pool.
6. Lower cask into the pool.
7. Load the spent fuel assemblies into the canister.



Loading Fuel into Cask

8. Install the canister shield plug underwater.

9. Lift the cask out of the pool water.

10. Drain water as required before the welding operation.

11. Wash down the exposed portions of the transfer cask.

12. Move to cask decontamination area.

Lowering Transfer Cask to Decontamination Area

13. Lift the automatic weld machine (AWM) and install it over the inner top cover plate. Lift AWM and inner top cover together and install them over the canister. (The inner top cover plate and welder can be lifted and installed separately).

14. Perform inner top cover weld.

15. Connect the vacuum drying system to the vent and siphon ports.

16. Remove bulk water from the canister using pressurized air.

17. Perform vacuum drying and helium backfilling.

18. Install and seal weld the vent and siphon port covers.

19. Mount the AWM and outer cover plates on the canister.

20. Weld the canister outer top cover plate.

21. Bolt the cask lid.

22. Lift the transfer cask and move it to the loading bay.

Transport to the ISFSI

Canister transfer operations include; 1) transferring the loaded cask to the on-site transport trailer, 2) transporting the cask/canister to the ISFSI, and 3) inserting the canister into the storage module. The operations include:

23. Set the lower trunnions of the transfer cask into the support skid on the trailer.

Lowering Cask onto Trailer

24. Rotate the transfer cask to a horizontal orientation.
25. Use the on-site trailer to transfer the cask and canister to the ISFSI.

26. At the ISFSI, back the trailer and align the cask with the storage module.

Alignment of Cask with Storage Module

27. Remove the hydraulic arm access cover, the cask lid and the storage module door.

28. Use the hydraulic arm to insert the canister into the storage module.

29. Install the storage module door.

Appendix D – Holtec Loading Operations

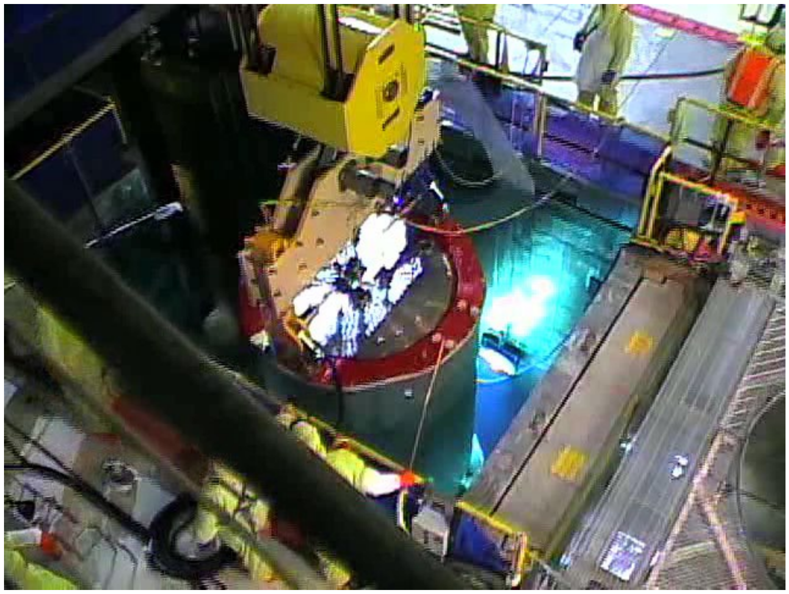
Canister Loading

Cask loading includes physically placing the fuel assemblies into the canister, draining, decontamination, closure and MPC transfer into the HI-STORM FW Overpack and includes the following sequence of events:

1. Place the empty MPC into the HI-TRAC
2. Lift the HI-TRAC and place it vertically in cask decontamination area
3. Fill the MPC annulus with demineralized water and install the annulus seal
4. Engage the lifting yoke with the HI-TRAC lift lugs
5. Lift the HI-TRAC and MPC up to the spent fuel pool

HI-TRAC and MPC Movement to the Spent Fuel Pool

6. Lower cask into the pool

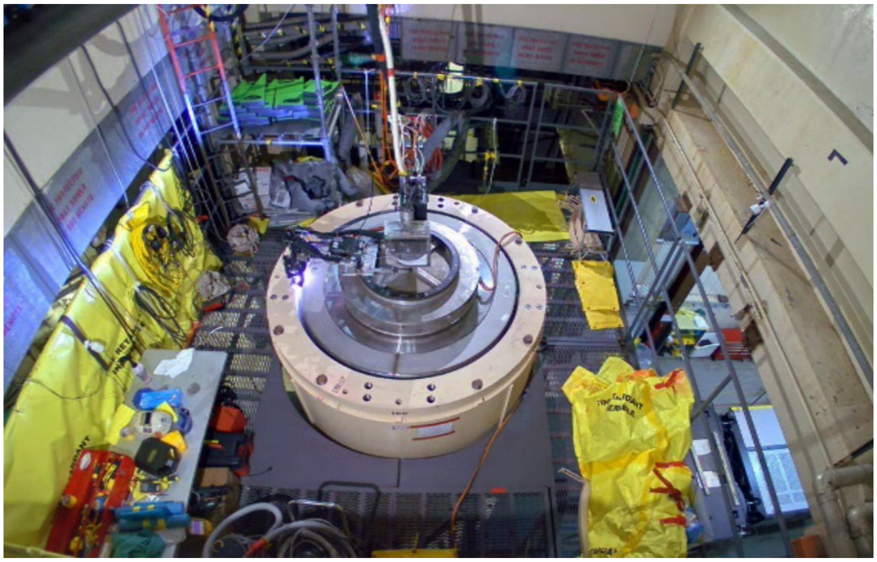


HI-TRAC and MPC being Lowered into the Spent Fuel Pool

7. Load the spent fuel assemblies into the MPC
8. Install the MPC lid underwater
9. Engage the lifting yoke and lift the cask out of the pool water
10. Move to cask decontamination area
11. Perform HI-TRAC decontamination
12. Perform MPC Closure Welding
13. Perform MPC draining, drying and backfill with helium

MPC Preparation (Left) and Helium Backfilling (Right)

14. Complete MPC closure welding



Final MPC Closure Welding Using Automatic Welding System

15. Install the MPC Lift Cleats

HI-STORM Preparation

1. Position the empty HI-STORM FW Overpack on HI-PORT

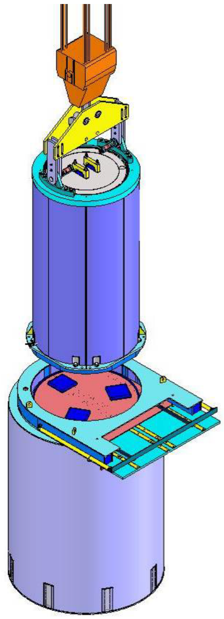
HI-STORM FW Overpack on HI-PORT

2. Position the empty HI-STORM FW Overpack in the Truck Bay
3. Remove the HI-STORM FW Overpack Lid
4. Install the Mating Device on HI-STORM

HI-STORM Overpack, Mating Device, HI-TRAC, Lift Yoke and Lift Cleats

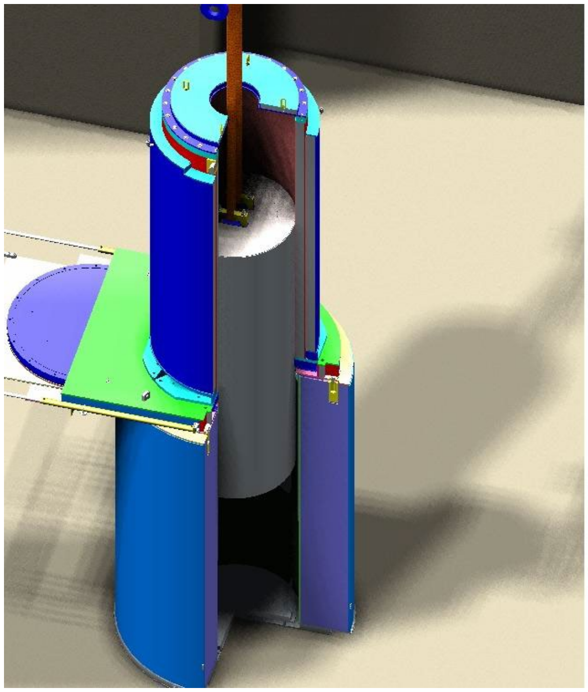
MPC Transfer to HI-STORM

1. Raise HI-TRAC from the Decontamination area and place it on the Mating Device



Placement of HI-TRAC and MPC on HI-STORM FW with Mating Device

2. Attach the MPC Downloader Slings between the lift yoke and the MPC Lift Cleats
3. Raise MPC slightly
4. Remove the HI-TRAC bottom lid bolts
5. Open the Mating Device to remove the HI-TRAC bottom lid
6. Lower the MPC into the HI-STORM FW Overpack



Lowering of MPC into HI-STORM FW Overpack

7. Disconnect the MPC Downloader Slings from the lift yoke
8. Remove HI-TRAC from the Mating Device
9. Disconnect the MPC Downloader Slings and MPC Lift Cleats from the MPC

Loaded MPC Fully Lowered into the HI-STORM FW Overpack; Lift Cleats and Downloader Slings Removed

10. Remove the Mating Device
11. Install the HI-STORM FW Overpack Lid
12. Place the HI-STORM FW Overpack on the ISFSI Pad

HI-STORM Movement to ISFSI Pad Using Vertical Cask Transporter

ISFSI Pad Containing HI-STORM FWs

Prairie Island SEIS – Additional Information
October 11, 2021

1. Xcel's request is to use any NRC-approved cask. What is the world of casks? How can it be categorized? e.g., bolted casks, vertical overpack, horizontal overpack? Is there a listing of all NRC-approved casks? Is this the best list? https://www.nrc.gov/waste/spent-fuel-storage/designs.html Are there any casks in the "world of NRC casks" that Xcel would not use? For example, we're not going to switch to a different bolted cask… we want to switch to a canister system.

   I think the concern here is that when we say "any," that opens up an infinite world of casks. But the world of NRC-approved casks is finite. The SEIS needs to describe this finite world.

   Resp:
   The link above does show the complete list of casks currently approved by the NRC for general use. Other designs may also be available when we begin the process to select the next cask order. The Company proposes to solicit proposals from the applicable welded, canister-based designs that are approved by the NRC both for on-site storage under their regulations under 10CFR Part 72 and off-site transportation under 10CFR Part 71. We would also request a proposal for additional TN-40HT casks, to ensure the change in technology is the best option.

2. We received comments and questions about Minn. Stat. 116C.776 re: are the casks are Prairie Island transportable.
   - We clarified at the public meeting that TN-40 casks are transportable. Can we point to any documentation on this point?
   - We indicated that a TN-40HT application is in the works to NRC. Any update on this?
   - NRC approval for TN-40HT expected because similar to TN-40. How are they similar? How are they different?
   - What are the criteria used by NRC to determine certification for transport?

   Resp:
   - The TN-40 is identified in the NRC list of licensed spent fuel packages at the following site Package | NRC.gov. The NRC Certificate is 71-9313.
   - A pre-application meeting for the TN-40HT transportation license was held with the NRC staff on September 8, 2021. Work is on track to submit this application later this year.
   - The TN-40HT cask is very similar in design to the TN-40 cask. The major difference is that the TN-40HT cask is designed to store higher initial enrichment and higher burnup fuel. In order to accomplish this, the heat transfer capability of the basket design was enhanced. Compared to the TN-40, the TN-40HT cask includes an improved heat transfer basket design by altering the basket component dimensions and configuration.

     To maintain the loaded cask weight the same the increase in weight due to the basket modifications was offset by adjusting the thickness of the outer shell components. The TN-40HT cask uses the same equipment as the TN-40 for lifting, loading, and transporting. The cask loading and unloading sequence of operations is also the same for both.

   - NRC criteria for transportation casks are contained in 10CFR Part 71 (Part Index | NRC.gov), and NUREG-2216, Standard Review Plan for Transportation Packages for Spent Fuel and Radioactive Material (Standard Review Plan For Transportation Packages For Spent Fuel And

Radioactive Material: Final Report (NUREG-2216) | NRC.gov). The NRC will review the vendor evaluations of the cask in the flowing areas

- Structural evaluation
- Thermal evaluation
- Containment evaluation
- Shielding evaluation
- Criticality evaluation
- Material evaluation
- Operating Procedures
- Acceptance tests and maintenance program

The casks must be demonstrated to function after several postulated accident scenarios, including drops onto an unyielding surface (30 feet), crush strength (1,100 lb mass from 30 feet), puncture resistance (1 meter drop onto a 6-inch bar), exposure to fire (1,475F for 30 minutes) and immersion in water (50 feet). With the exception of the immersion test, a cask must be exposed to each of these events in sequence.

3. There was a good amount of discussion of how the new casks would be reviewed and approved by NRC. Particularly how the process would proceed given that the ISFSI has a specific license.
   - Jon gave examples of other plants with a specific license that used a general license for different NRC-approved casks? What are these plants? Is there a plant similar to PINGP that is the best analogy?
   - Do we have examples of cask certificate of compliance conditions? Or more examples? You previously noted – "Licensees are required to perform evaluations of their site to demonstrate that the site is adequate for storing spent fuel in dry casks. These evaluations must show that the cask Certificate of Compliance conditions and technical specifications can be met, including analysis of earthquake events and tornado missiles."

   - The plants mentioned at the meeting were Surry, North Anna, and Oconee. Surry or North Anna would be good examples to site.
   - An example of the conditions imposed by the NRC for certificate holders can be found in the license for the NUHOMS system used at Monticello (NRC: Package ML21109A325 - Issuance of Certificate of Compliance No. 1004, Renewed Amendment No. 17, for the Standardized NUHOMS® System).
   - The General License process is governed by 10CFR Part 72, Subpart K. The process required for a site to use a General License cask is defined in 10CFR 72.212. The NRC website provides a detailed description of the consideration that must be addressed before a Licensee may use a General Licensed cask on their website at General License Considerations For Spent Fuel Storage In An Independent Spent Fuel Storage Installation At A Reactor Site | NRC.gov

4. Will any local permits or approvals be needed for a change in casks? Would it depend on vertical vs. horizontal overpack?

   Resp:
   A building permit may be required from the City of Red Wing depending on the need for any ground disturbing activities (e.g. additional paving or vault construction)

5. Rectangular concrete vaults (horizontal overpack) are constructed on-site, yes? What is entailed in constructing them?

Resp: Modular vaults could be constructed on-site or offsite. The Monticello vault components were fabricated off-site and then assembled at the site. The components pre-fabricated offsite included the internal steel support structure and the concrete walls and roof.

6. How many workers at the PINGP?

   Resp: The Prairie Island plant employs about 600 workers.

7. What is the dose limit for workers at the plant? Are there set limits, e.g., 500 mrem, 5 rem? Per month? Per year?

   Resp: The NRC dose limit contained in 10CFR Part 20 is an annual Total Effective Dose Equivalent (TEDE) of 5,000 mrem/year. TEDE is defined as the sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures)

   In practice worker exposures are far less than this NRC limit. Worker exposures are reported to the NRC based on total cumulative exposure, total number of monitored workers, and number of workers with a measurable dose. The most recent NRC reporting of radiation exposure to workers[1] shows the Monticello and Prairie Island values are as follows

	Total number monitored	Number with measurable dose	Total collective exposure (mrem)	Average dose (all) (mrem)	Average to those with measurable dose (mrem)
Monticello	1,660	273	29,238	17.6	107
Prairie Island	1,865	559	37,731	20.2	67.5

8. What is the estimated dose rate with 55 NT-40s and 10 NUHOMS? Even if it's a number with caveats… what do you estimate the number to be and what are the caveats. You had noted – "The calculation compared 9 TN-40 casks to that from 10 NUHOMS canisters (1 more canister is needed for the same amount of fuel based on capacity). The calculation assumed 64 TN-40 casks in in case, and 55 TN-40 casks and 10 NUHOMS canisters in the other. The calculation demonstrates that 10 NUHOMS canisters would result in lower offsite radiation doses than 9 TN-40 casks."

   Resp: The EIS for the expansion of up to 64 TN-40 casks estimated the annual offsite dose to the nearest resident would be a maximum of 0.4 mrem/year. The referenced calculation determined the relative impact of replacing the last 9 TN-40 casks with the NUHOMS casks used at Monticello. The calculation was useful to demonstrate that the NUHOMS design provides additional shielding versus the TN-40 casks and the incremental dose from 10 NUHOMS casks storing the same fuel as 9 TN-40 casks would be lower. However as 55 TN-40 casks would be stored in both scenarios, the expected impact on the overall dose would be low. It would be fair to state that the expected maximum dose to the nearest resident would be 0.4 mrem/year or slightly less if the NUHOMS design were selected.

[1] NUREG-0713, Volume 40, *Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities* 2018

Prairie Island SEIS – Additional Information
11.4.21

1. *Discuss Xcel's intentions regarding transportation of spent fuel and potential repacking. The intent is that all casks will be approved for storage and transportation, yes? Such that Minn. Stat. 116C.776 is moot (or satisfied), yes? TN-40 already approved; TN-40HT soon to be in process; any new casks selected would be approved for both storage and transportation?*

   Response: Correct, any new design to be considered will be licensed by the NRC for both storage and transportation.

   - *What are NRC regulations for transportation approval*?

     Response:
     NRC criteria for transportation casks are contained in 10CFR Part 71 (Part Index | NRC.gov), and NUREG-2216, Standard Review Plan for Transportation Packages for Spent Fuel and Radioactive Material (Standard Review Plan For Transportation Packages For Spent Fuel And Radioactive Material: Final Report (NUREG-2216) | NRC.gov). The NRC will review the vendor evaluations of the cask in the flowing areas
       - Structural evaluation
       - Thermal evaluation
       - Containment evaluation
       - Shielding evaluation
       - Criticality evaluation
       - Material evaluation
       - Operating Procedures
       - Acceptance tests and maintenance program

     The casks must be demonstrated to function after several postulated accident scenarios, including drops onto an unyielding surface (30 feet), crush strength (1,100 lb mass from 30 feet), puncture resistance (1 meter drop onto a 6-inch bar), exposure to fire (1,475F for 30 minutes) and immersion in water (50 feet). With the exception of the immersion test, a cask must be exposed to each of these events in sequence.

   - *Has repacking / repackaging of spent fuel been done anywhere in U.S. or world?*

     Response:
     This is not a typical operation required at either nuclear power plant or fuel cycle facility. We are aware of a cask similar to the TN-40 (a TN-68) that was brought back to a spent fuel pool for replacement of the cask seals. During the seal replacement the fuel was removed for inspection and then returned to the cask.

   - *Have any TN-40 seals been replaced at PINGP? What are the criteria for replacing a seal?*

Response:
No seals have been replaced on a TN-40 to date. Seals are continuously monitored by measuring the overpressure maintained between the two seals. If this pressure monitoring indicated an issue a troubleshooting plan would be implemented to determine the cause. If the investigation determined one of the seals was degraded the cask would be returned to the spent fuel pool for seal replacement.

2. *What would be the impact on property taxes (or other taxes paid by the PINGP) if a different cask/canister was selected? Particularly for the city of Red Wing, Goodhue County, local schools.*

   Response:
   While we expect different designs would be less expensive, the cost savings from the substitution of the last 9 (of 64) TN-40 casks with 10 canister systems would have a relatively minor impact on the total site valuation, which is the basis for the Company's property tax liability for PINGP.

3. *What would be the impact on the PINGP emergency response plan if a different cask/canister was selected?*

   Response:
   There should be no impact on the emergency response plan if a different vendor is selected.

4. *Monies for long-term storage and decommissioning. What is status of state decommissioning trust fund? What lawsuits have been filed against the federal government – any funds received and where did they go?*

   Response:
   The nuclear decommissioning trust continues to be sufficiently funded to provide for safe decommissioning at the end of plant life. The Company and PUC regularly review the trust's status and funding requirements. This process is currently ongoing in Minnesota PUC Docket E002/M-20-855

   The Department of Energy has been found in partial breach of contract over their failure to remove spent fuel from reactor sites, including Prairie Island and Monticello. The Company periodically files a claim in the US Court of Federal Claims to recover costs related to the continued storage of spent fuel at our sites. The money received from the breach of contract is then used to benefit Xcel Energy customers- via customer credits, reducing decommissioning fund contributions, or as an offset to mitigate customer rate increases.

5. *Please provide a current fuel assembly inventory, e.g.,*

Response:

Location	Number of Assemblies
Reactor	242 (121 per reactor)
Spent Fuel Pool	1,021
TN-40 Casks	1,160
TN-40HT Casks	720

6. *All cask and canisters must meet NRC requirements. What about drop test of canisters? Several commenters are wary than a 1-inch thick canister is not as resilient to dropping as a 10-inch thick cask. What about this? What does NRC say? What does Xcel say?*

   Response:
   All transportation systems, including canister-based systems, must meet the same NRC requirements to be licensed for transportation. The drop test requirement referenced is related to transportation licensing, not storage. Before shipment a canister would be transferred to a thick-walled shipping cask and impact limiters would be attached to each end. The NRC provides detailed information on their regulation and the safety of spent fuel transportation on their web-site at Transportation Of Spent Nuclear Fuel | NRC.gov

7. *Have potential effects of climate change on casks been accounted for? If so, by whom? For example, more moisture; freeze-thaw cycle; more severe storms; higher temperatures.*

   Response:
   The TN-40 casks have been designed to a wide range of environmental conditions designed to conservatively bound expected extreme climate conditions. Cask designs that are generally licensed for use are licensed for use at any site in the US, from the cold of Minnesota to the heat of Arizona.

   The NRC and nuclear industry have processes in place to review the safety implications of any new information that becomes available, include any regarding extreme weather conditions. The industry also has a process to review new information regarding external hazards that includes assessing any safety implications of the new information.

8. *Discuss the regulatory history of the ISFSI. Licensed originally? Licenses renewal applied for / granted when? For how long? Studies conducted by NRC related to licensing and renewals?*

   Response:
   The Prairie Island ISFSI was initially licensed by the NRC on October 19, 1993. The ISFSI license has been renewed and currently has an expiration date of October 31, 2053.

The NRC review of the renewed Prairie Island ISFSI license includes a draft Environmental Assessment and Finding of No Significant Impact noticed in the Federal Register (78 FR 69460) and a final Environmental Assessment issued on July 1, 2015 (80 FR 37662). The technical basis for issuing the renewed license is set forth in the enclosed staff's safety evaluation report for the ISFSI (NRC ADAMS ML15336A230)

9. *Table-top exercise at Prairie Island, May 21, 2019. What happened? What was learned? PIIC notes that exercise was valuable in that "a number of potential issues were identified and resolved by participants talking face-to-face." What were these issues?*

Response:
On May 21, the Nuclear Energy Institute (NEI) conducted a "tabletop exercise" that focused on key actions needed to transport spent nuclear fuel from a nuclear power plant site to a consolidated interim storage facility (CISF) under a private shipment model, meaning the Department of Energy (DOE) would not be involved in logistics, funding, transport, or storage of the spent fuel. Xcel Energy was a partner and hosted the tabletop at our Prairie Island Nuclear Plant.

This simulation allowed observers to gain a better understanding of the spent fuel transportation planning and implementation processes through observing participant dialogue, information transfer and decision-making on legal, regulatory and process requirements, as well as stakeholder interests.

Close to 150 people attended either as participants or observers and included Nuclear Regulatory Commissioner and NRC staff, two representatives from the Minnesota Public Utilities Commission (PUC), two members of the Prairie Island Indian Community tribal council, MN state, city and county elected officials,

The exercise objectives were:

- Identify and discuss key steps necessary to safely and efficiently transport spent nuclear fuel from a nuclear power reactor site to a Consolidated Interim Storage Facility (CISF). Hypothetical location of a power plant in Midwest to a CISF location in the Southwest area of U.S.
- Enhance leadership and coordination efforts by promoting relationships, fostering communications and information sharing among stakeholders in attendance (participants and observers).
- Identify opportunities to demonstrate the inherent safety and security assured through regulatory compliance, and to improve regulatory efficiency.
- Understand key operation assumptions including transport casks, needed lifting hardware and stillage structures, and required road, rail and water transport equipment are available
- Certificates of Compliance requirements are met (including pre and post transport inspections)
- Discuss contingency/emergency plans and responses that could be implemented if needed.
- Review applicable insurance coverage for spent fuel transportation.

Three possible modes of transportation were presented – barge, heavy-haul truck, and rail. The transport process involves:

- Selection of the appropriate mode(s) of transport
- Development of route and obtaining route approval under NRC guidelines, including route planning and security planning;
- Physical transport.

Key Take-Aways

- In order for industry to be prepared to transport used nuclear fuel, strong relationships with stakeholders will need to be established and maintained over a long period of time.
- The exercise is broadly viewed as beginning of ongoing dialog and communication with all stakeholders.
- Early planning is a key to future success.
- Outreach to tribal communities located on nearby or transited lands is important. The sovereignty and cultural significance of tribal lands is of utmost important to these communities. They expect early and frequent engagement.
- Indian Tribes do not get notified automatically of spent fuel shipments but can "opt in" to be informed, according to the guidance in NUREG-0561, Physical Protection of Shipments of Irradiated Reactor Fuel, which applies to private shipments.
- The role of the licensee must be understood and communicated.
- The licensee must be proactive rather than reactive in assuring public safety and security.
- The states are co-regulators for spent fuel shipments, and as such, the states have the responsibility to enforce some of the federal regulations that govern the shipment of radioactive materials.

Regarding Xcel Energy

We took a leadership role in this tabletop because we know the importance of engaging stakeholders as we develop the steps it will take to move used fuel from our plant sites to an interim or permanent storage location.

- Our objective was to demonstrate that transporting used nuclear fuel:
  - Is not a new activity
  - Is safe. Which has been demonstrated by the long history of safe transportation of used nuclear fuel
  - Industry understands the processes and requirements to transport used fuel
  - And the Industry hopes to identify efficiencies and opportunities for improvement through our exercise
- Consider the history of the transportation of used nuclear fuel

- Since the early 1970s, there have been about 7,000 safe shipments of more than 80,000 metric tons of used nuclear fuel worldwide, none of which has involved any leaks of radioactive material or personal injury.
- In fact, Xcel Energy has experience moving spent fuel ourselves; under a contract with General Electric, we moved a little over 1,000 fuel assemblies from our Monticello plant to a facility in Morris, Illinois in the 1980s. We have also shipped used fuel from our shut down Colorado plant to Idaho.
- These rail shipments were done safely and without issue
- Regardless of the shipment destination, the industry will continue to build on the established track record of safe shipment through robust design, adherence to regulations, and implementation of security requirements.

This is the beginning of the conversation and we will continue to lead industry efforts to stay focused on the issues surrounding transportation.

- *How would casks be moved from Prairie Island? ISFSI to crawler to railcar? Is ISFSI cask put into another "rail cask" for transport? If not, how is cask secured to rail car? Protected during transport?*

  Response:
  This is correct. The spent fuel cask would be loaded into an overpack designed for transportation and secured in a rail car certified to move spent nuclear fuel.

- *Did table-top exercise walk through these steps?*

  Response:
  Yes it did.

- *How would you protect against radiation exposure during loading / transport? TN-40 vs. canister system?*

  Response:
  The NRC imposes limits on allowed radiation levels for all transportation containers transporting radioactive materials, include spent nuclear fuel. These levels are designed to minimize any potential impacts to the public and workers loading and transporting the material. Security requirements for spent fuel transportation also limit the ability of members of the public to approach a transportation cask.

Safety of all Metal Cask Designs vs Canister-Based Systems

General Description

Spent fuel storage systems such as the TN-40 and the NUHOMS system at the Monticello plant use multiple layers to confine and protect the spent fuel contained in the cask. All use a metal inner cylinder to confine the fuel and provide a leak tight confinement barrier. Additional layers of steel or concrete then provide radiation shielding and protection from external hazards.

The TN-40 cask design consists of an inner containment shell made up of a steel cylinder with welded bottom, a welded flange on the top, and a steel lid with two metallic seals bolted to the flange. This confinement shell is designed to hold the fuel in an internal basket structure and provide a leak tight isolation of the fuel from the atmosphere. Around this inner shell is a second layer of steel which provides additional radiation shielding and protection from external hazards. This configuration is used throughout the loading and storage process.

Canister based systems such as the NUHOMS design used at the Xcel Monticello plant also have an inner confinement shell that provides the isolation of the fuel from the atmosphere, but instead of a bolted lid with metallic seals they use two separate lids that are welded to the canister. To provide protection of this inner canister similar to that of the TN-40, canister-based systems use a multi-layer transfer cask during loading operations and concrete overpacks for shielding and protection from external hazards during storage.

Protection from Postulated Events – TN-40 vs Canister Systems

NRC regulations require that dry cask storage systems provide protection from a wide variety of postulated events, from handing events such as cask drops to external hazards such as tornadoes. All systems must meet the same requirements whether they are an all-metal design like the TN-40 or a canister system such as used at Monticello.

During all cask handling, either TN-40 or canister based, inside the Prairie Island plant protection from dropping the load is provided by the use of a single-failure- proof crane and handling system. This system is designed to meet stringent NRC requirements for handling heavy loads in nuclear power plants[1]and precludes the dropping of the cask during movement. When other systems are used for cask movement (i.e. the vehicle that moves the loaded cask to the ISFSI facility) NRC limits preclude lifting the cask above a specified height. This height is the one used in the cask drop analysis contained in the Safety Analysis Report and is 18 inches for the TN-40 cask. The NUHOMs system has a similar limitation during transfer operations specified in their SAR.

During transfer operations, the TN-40 cask relies on the dual walled steel design to protect the fuel. Similar protection of the canister design is provided by a transfer cask during the operations to load the fuel and dry, inert, and weld the canister lids. This transfer cask is then used to move the loaded canister into its final configuration, either a horizontal concrete vault or a vertical concrete overpack. The transfer cask structural components are made of steel and often contain a layer of lead for additional radiation shielding. The transfer casks provide the similar protection from external events as the outer layer of the TN-40 cask, and outwardly look similar to a TN-40 (see Figures 1-3). As an example, the NUHOMS transfer cask used at Monticello is designed to provide protection of the canister and fuel from earthquakes, accidental load drops during transfer to the ISFSI, thermal loads, and tornado wind and missile loads.

When in storage canister-based systems rely on the concrete structures around the sealed canister for protection and radiation shielding. These concrete structures provide protection from external hazards such as tornado winds and missiles generated by these winds, earthquakes and floods. This configuration is similar to the design of the Prairie Island containment domes, which consist of a reinforced concrete shield building surrounding an inner metal containment structure.

Summary

Similar to the TN-40 cask design, canister-based systems rely on surrounding structures to provide protection for the inner confinement structure. The TN-40 relies on an integral outer layer of steel during all loading and storage operations. Canister systems use a robust metal transfer cask to provide this protection during loading operations and separate concrete structures during storage. The bare canister is never handled by itself once fuel is loaded, it is always inside either a transfer cask or protective concrete structure. Cask handling inside the plant building is performed using a single-failure-proof lifting system. All designs must meet the same NRC

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[1] NUREG-0612, *Control of Heavy Loads at Nuclear Power Plants*

requirements for postulated events during handling and storage including load drops and external forces from tornados and earthquakes, among others. The approaches may be slightly different, but the level of safety is the same for all designs.

Figure 1

NUHOMS Transfer Cask

Figure 2
NUHOMS transfer cask during canister placement into the concrete module

Figure 3

Holtec Transfer Cask

Preparing FINAL SEIS – Prairie Island
Questions and Comments Received

1. What is the number of full-time residents within two miles of the PINGP? 2009 EIS said 450. Can we get an updated number? If necessary, an updated number with a different radius, e.g., within 3 miles? Or 5 miles? The 2015 federal EA has a 10-mile number (50,308, page 3-8 of the EA). Is this our best estimate?

   Response: Our current estimate is that 398 people live within 2 miles of the Prairie Island plant. This estimate is based on the 2010 Census. (Reference: Prairie Island Updated Safety Analysis Report, Table 2.2-1 Estimated 2010 Resident Population Distribution within the Prairie Island Emergency Planning Zone)

2. Xcel Energy Additional Information. This information will be filed in eDockets so that it can be referenced in the EIS. However, there are a few instances where more information would help:

   a. Is there a link for the TN-40HT transportation license application / application letter?Jon sent the letter itself. Is there a link via the NRC ADAMS system?

      Response: It does not appear to have been uploaded to ADAMS as of this date

   b. Is there a link to the original ISFSI license, 1993? A link to the renewal?

      Response: ADAMS records back to 1993 (original license) are somewhat limited, but the request to the Commissioners for approval and their votes can be found at ML20058M133, ML20059B412, ML20059B415, ML20059B418.

      The renewed ISFSI license can be found in ADAMS at ML15336A101

   c. When did the NRC implement its general license process? After the initial Prairie Island specific license…. but when? Is there a link to this decision? Or to the rule?

      Response: NSP selected the TN-40 design in 1989 and immediately began working with Transnuclear on developing an ISFSI license application. The Prairie Island ISFSI site specific application was submitted in August 1990.

      The General License Process as approved on July 18, 1990 (55FR29181, https://www.govinfo.gov/app/details/FR-1990-07-18). The rule language was working through the NRC rulemaking process up to that time and not available when the Prairie Island ISFSI license application was being developed.

      It's worth noting that even if the General License process did exist at the time, the TN-40 may not have used that process. The TN-40 cask is designed specifically for the Westinghouse 14x14 fuel design[1] which is smaller than the fuel used in the majority of

[1] 14x14, 15x15, and 17x17 refers to the number of rods on each side of the assembly lattice.

Westinghouse reactor designs (15x15 and 17x17). Prairie Island is one of only 4 sites that use the 14x14 design so the expense of a general license would likely not have been justified for Transnuclear. Of the 3 other sites one had already selected a competing design and another had crane limitations leaving at most one other potential customer. Transnuclear did eventually apply for and receive a Certificate of Compliance for the TN-32 cask, which can store the larger fuel designs used at most Westinghouse reactors.

d. Where does this information come from? --- "The two largest manufactures of canister systems are Holtec International, with 1,657 canisters currently in use, and Orano, with 1,205 canisters currently in use. By comparison, there are currently 203 TN casks in use in the United States (TN-32, TN-40, and TN-68 models)."

Response: This information came from private conversations with the named vendors and is consistent with the recent issue of an industry trade publication we subscribe to (UxC StoreFuel, February 8, 2022).

3. Decommissioning. The 2009 EIS discusses potential radiological impacts at decommissioning, with a total of 98 casks in the ISFSI. Would 98 TN-40's fit on the existing ISFSI pad? Would it need to be expanded? Assuming canisters are used for 55-64 and then for decommissioning… would they fit on the exiting pad? Or would it need to be expanded?

If any expansions are necessary, would they be at / part of the existing ISFSI? e.g., add another concrete pad, adjust berm, etc.

Response: The current ISFSI configuration includes 3 separate concrete pads each capable of storing 24 TN-40 casks. A fourth pad would allow 96 casks to be stored.

The most recent Prairie Island decommissioning filing submitted to the MN PUC (Docket E002/M-20-855, 12/1/2020) assumes that the existing ISFSI will be modified as needed to accommodate additional casks used for decommissioning[2]. This would include additional concrete pad(s) and potentially an increase in size of the fenced facility.

[2] Section 3.5.1, Page 9 of 88; "This analysis assumes that the existing ISFSI is modified at the cessation of plant operations to accommodate the fuel present in the storage pool at shutdown."

4. Environmental justice – several comments were received re: environmental justice. Has Xcel addressed EJ concerns with the PIIC through investments in the PIIC or other monies? Has this been 'on the record' as an EJ mitigation measure? 'Off the record' as a private agreement?

   Response: The Prairie Island Indian Community is an important and valued stakeholder in our operations. In addition, they are a separate government entity. We have regular informal communication approximately weekly but also meet with the tribal council quarterly to keep them updated on plant activities and filings that will impact the Community. We work together on areas of mutual interest such as moving used fuel to a federal or private interim or permanent storage location.

   We have formal agreements such as the plant license renewal contention settlement, where the Company committed to a cultural resource management plan that includes training and procedures regarding ground disturbing activity. We also have formal settlement agreements that are the result of the 2003 legislation that authorized additional used fuel storage at Prairie Island. This includes remuneration to PIIC. We would prefer not to disclose details of this agreement without first consulting tribal leadership. If you feel this information is important to include in the EIS we could reach out to PIIC to determine if they wish us to disclose these details.

   Another would be to move the spent fuel away from the PIIC, to a different location in Minnesota. If the Minnesota legislature approves a move? And the NRC as well?

   Response: While it would be physically possible to move fuel to another site in Minnesota, the Minnesota PUC and Legislature have only authorized storage of spent fuel at the existing Prairie Island and Monticello nuclear power plant sites. As directed by the 1994 legislation initially authorizing the Prairie Island ISFSI the Company applied to the Minnesota Environmental Quality Board for a stand-alone ISFSI to be in Goodhue County, but not on Prairie Island. The EQB denied the necessary approval as the "no action" alternative of storage at the existing ISFSI was deemed preferrable over creating a new facility.

5. General license process --- several comments on the NRC licensing process.

   Xcel filed comments distinguishing "file" vs. "make available" to NRC….. "Xcel Energy must notify the NRC at least 90 days before its first storage of spent fuel under a general license. The Company must also register the use of each cask with the NRC no later than 30 days after the use of that cask. The documentation prepared by Xcel Energy in advance of using a certified cask must be made available for inspection by the NRC, but it is not required to be filed with the NRC."

Is this citing or interpreting and NRC rule? If so, what is it?

Response: General License conditions are contained in 10CFR 72.212 (§ 72.212 Conditions of General License Issued Under § 72.210. | NRC.gov). The specific citations to required records and notifications are (emphasis added)

72.212(b)(1)
(1) Notify the Nuclear Regulatory Commission using instructions in § 72.4 at least 90 days before first storage of spent fuel under this general license. The notice may be in the form ….

72.212(b)(2)
(2) Register use of each cask with the Nuclear Regulatory Commission no later than 30 days after using that cask to store spent fuel. This registration ……

72.212(b)(14)
(14) Make records and casks available to the Commission for inspection.

6. Xcel provided additional information about worker radiological doses and a revised Table 4. Could you add a description of the overpacks used to Table 4? Actually, we know Monticello is a horizontal overpack and the Holtec data is from a vertical overpack. What about the new data from TN Americas? Vertical or horizontal overpack?

   Response: The TN Americas data is a horizontal NUHOMS system similar to that used at Monticello. The data is from Pressurized Water Reactor fuel similar to Prairie Island (only larger). The additional data is intended to provide a closer estimate to what may be expected is used for Prairie Island fuel.