Demystifying Spent Fuel Transport Readiness

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The Skills and Experience to Deliver Nuclear Excellence
NAC UNF Transportation Overview

- First NAC spent fuel transport shipment was in 1973
- Four decades of cask system design, licensing and deployments
- Operates fleet of 8 NAC-LWTs and 1 OPTIMUS system
- Lead spent fuel transport provider for PIE projects
- Transport CoC validations in more than 50 countries
- Lead contractor for DOE’s FRR program for first 16 years
- NAC-STC transport cask fleet (10 casks) supplied to 2 international customers
- Routinely and actively transporting UNF on U.S. soil

38 Shipments completed in 2019
Although most of NAC’s shipments have been by road, some shipments have required Intermodal transport.
Defining Private Transportation Readiness

- Point A – Site operating under 10CFR50/72
- Cask Loading – Transfer from 72 to 10CFR71 configuration
- Transportation planning and execution
- Cask Unloading – Transfer from 10CFR71 to 72 configuration
- Point B – Site operating under 10CFR72

“You want to speed up the game, don't let the ball go out of bounds.” — Bert McCoy
Point A Readiness

- Site infrastructure improvements
  - Rail spur, barge slips, heavy haul path, etc.
  - Transfer equipment to address all aspects of canister transfer operations

- Transport cask contents
  - Approve CoC contents and conditions of transport
  - 72-71 Inspections and qualifications

- Programmatic controls
  - Staffing, procedures, permits and training
  - Contracts and transport planning

- Local stakeholder engagement support
Cask Loading Readiness

▪ Onsite Preparation Activities
  ▪ Mobilization of cask equipment and personnel
  ▪ Training, dry runs and equipment checks
  ▪ Canister inspections (as required)

▪ Canister Transfer to Transport Cask
  ▪ Canister transfers
  ▪ Cask closure and processing for transport condition
  ▪ System checks, transfer to transport mode vehicle and surveys
  ▪ Labeling, placarding, shipping papers
Transportation Plan Execution

- Per transportation plan and route approval. NAC and partners continue to assess best path forward and routes to relocate NAC canisters to ISP.

- Different routes have different requirements – Primarily driven by States/Tribes, Railroads or navigable waterways – Coast Guard & others.

- In most cases, rail transportation appears to be preferred assuming selection of railcar and permissible routes.
  - Railcars – 10CFR49 Subtitle B Chapter II accepted by railroad, AAR S-2043 compliance. ATLAS an option?
  - Some routes will require investments – barge slips, roads to rail head, other railroad requirements, rail and interline upgrades, etc.

- Security:
  - *On a typical NAC private shipment, secured escorts are provided primarily by the assigned States’ law enforcement agencies (varies), as outlined in security plan.*
  - *A rail shipment can pursue similar approach leveraging services – state police or railroad police per 49 CFR § 207 – for example, CSX or UP Special Agents.*
Transportation Plan Execution

- NAC Private Transport Planning, Notifications and Execution governed by 10 CFR 37, 10 CFR 71, 49 CFR
  - Private fuel shipments typically have involved notifications and coordination with NRC and State only. Tribes authorized by NRC can receive notifications.

- State primarily assigns responsibility to local law enforcement, first responders, others who really need to know (safeguards compliance). State bills the shipper for these services.
  - No other substantial stakeholder engagement has been required unless stipulated by licensee or authorities.

- Shipment tracking has been done privately with logistics partners. Railroad could provide similar service.
  - TRANSCOM could be useful – only if DOE provides access.

- In general, private shipments are only required to meet NRC and DOT regulations, whereas DOE may have additional self-imposed requirements.
  - Private/State services exist to address transport program aspects.
Cask Receipt and Unloading Considerations

- Receipt facility is licensed and built to receive and store canister/contents
- Cask receipt and unloading facility or equipment / procedures and personnel.
- Transport cask receipt, inspections and canister transfer back to 72 storage configuration.
- Inspection during or after canister transfer must be adequate to ensure canister was not damaged during transport.
- Any damage discovered must be assessed and handled with approved repair procedures as needed.
Point B – ISP Storage

- Storage cask move to the pad
- Operate/maintain per license
  - Aging management program
  - Required inspections
- Future transport assurance
  - Demonstrate continuous compliance with 72
  - Future transport casks may have added features to address any long-term issues.
  - Thermal and radiological decay will offer flexibility for system to transport.
Private Shipments – Who Pays?

- U.S. DOE has no authority to fund shipments from commercial ISFSIs to private fuel storage facilities – new legislation needed
- Current CISF models demonstrate there is economical justification to consolidate canister storage operations
- Currently, utilities implement ISFSIs at their own expense, then seek monetary damages or reimbursements from U.S. DOE
  - Under a private model, a fuel owner may decide to ship fuel off-site to CISF, and then attempt to recover those costs from DOE
  - Utilities must prove that the financial decision is sound – reduces future costs and liabilities to the government
- It is widely recognized that absent any government action, there will be further delays in U.S. spent fuel final disposition and U.S. government liability will continue to increase
- A prudent, financially viable and feasible path is to pursue consolidated interim storage in the near future
Private Transport Readiness by 2023

- Technology readiness – casks and transport systems
- Relevant experience to execute transport program
- Regulatory framework to perform private shipments
- Private security or governmental jurisdiction (ex. States) and protocols to support shipments
- Economical justification to move fuel to interim storage to minimize growing liabilities
- Where government could really help?

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