U.S. DEPARTMENT OF ENERGY | Office of Nuclear Energy

Long-Lead Planning for a Future Spent Nuclear Fuel Transportation Campaign

Erica Bickford, PhD

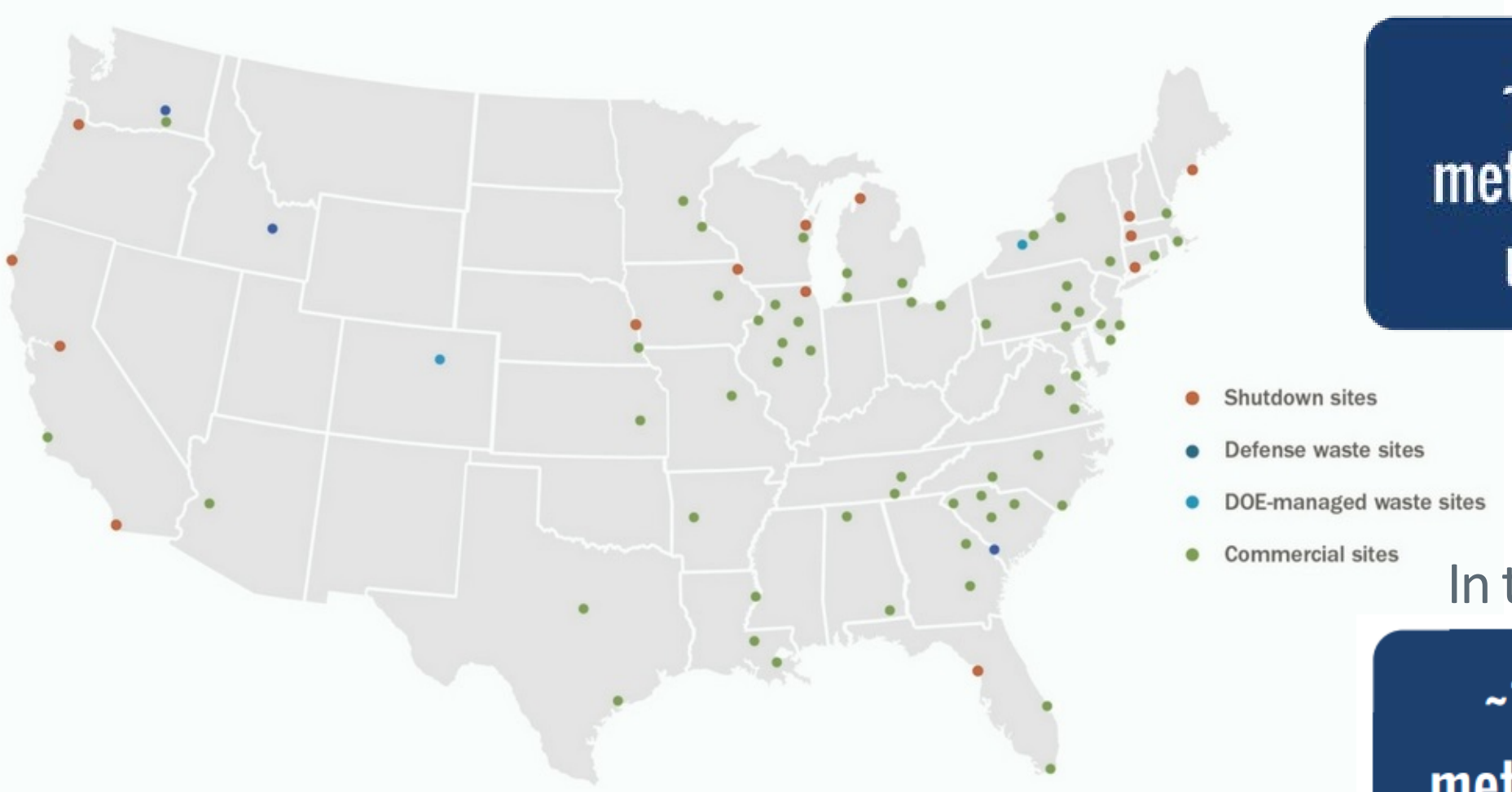
Office of Nuclear Energy

U.S. Department of Energy

March 9, 2017

Phoenix, AZ

Spent Nuclear Fuel in the US



Currently

~75,000 metric tons of uranium *

In the Future

~140,000 metric tons of uranium **

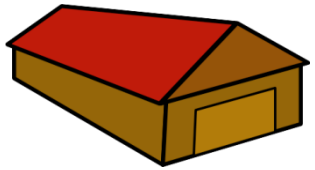
*Source: U.S. Energy Information Administration, Form GC-859, "Nuclear Fuel Data Survey" (2013).

**Source: Carter, J. and Dennis Vinson, "Nuclear Fuels Storage and Transportation Planning Project Inventory Basis" (2014).

Transportation Challenges – Public Acceptance and Confidence

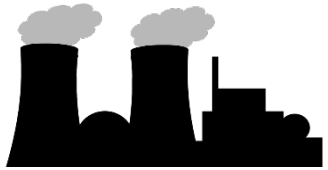
- Need to build understanding and awareness among the general public
  - Type B package integrity
  - Regulatory, safety, and security frameworks
  - Historical experience and safety record
- Need to finalize the program to provide technical assistance and funds to Tribes and states for training public safety officials (Nuclear Waste Policy Act Section 180(c)) – in progress
- Take lessons learned from other transport programs (eg. WIPP)
- Manage expectations relating to differences from other DOE shipping programs (e.g. highway vs rail)
- Establish robust coordination and communication

Communications Challenge - Concept of SNF Transportation System



Cask Maintenance Facility

Empty Cask



Nuclear Power Plant

Empty casks are loaded with spent fuel by utility

Loaded Cask

Safety Inspections and Shipment Monitoring

Storage/Disposal Facilities

Casks are emptied

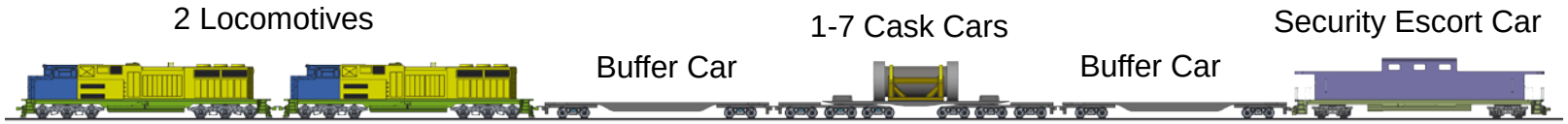
Empty Cask

Perform Cask Maintenance

Perform Railcar Maintenance

Railcar Maintenance Facility

Spent Fuel Railcar "Consist"



Transportation Challenges – Operations

- Need a destination
  - Routes/Route clearances – size and weight restrictions
  - Modal options (rail, heavy-haul to rail, heavy-haul to barge to rail) - where to transload?
- Need a shipping schedule, budget
  - Transport queue?
  - How much lead-time do sites need to be ready?
  - How many casks in a consist/How much space to load?
- Need to know shipping-time status of transportation infrastructure/plan for upgrades
- Using prior shipping campaigns as a model (Navy, FRR)

Low Overhead Bridge Near Big Rock Point

Current Condition of Onsite Rails at Maine Yankee

Portland Railhead Near Connecticut Yankee

Transportation Challenges - Hardware

- Need railcars designed for spent fuel transport (AAR S-2043)
  - Cask car to carry 17 different cask systems and a buffer car – in progress
  - Working with US Navy to use their escort car design
  - Extensive testing period
  - Plan to have a single, approved consist by 2022
- Need Transportation Casks
  - Multi-year fabrication lead-times
  - Cask ordering queue?
  - How many of each cask system to purchase?

Discussion

START