Nuclear Fuels Storage and Transportation Planning Project (NFST) Program Updates and FY16 Planning

Jay Jones
DOE-NFST
Tribal Caucus/NETWG Meeting
January 26-28, 2016
Palm Springs, CA
Contents

- Leadership update
- Consent-Based Siting
- FY16 Funding and Program Planning
- Action Updates
  - Railcar
  - NFST Reports
Organization Structure of the Office of Nuclear Energy
Organizational Structure of NE-5

**NE-5**
Deputy Assistant Secretary for Fuel Cycle Technologies:
*John W. Herczeg*

Acting Associate Deputy Assistant Secretary for Fuel Cycle Technologies:
*Andrew Griffith*

- Patricia Paviet
  - NE-51
  - Systems Engineering and Integration
    - Material Recovery and Waste Form Development
    - System Analysis and Integration
    - Fuel Resources

- Dave Henderson
  - NE-52
  - Fuel Cycle Research and Development
    - Advanced Fuels
    - Materials Protection, Accounting, and Control Technology
    - Uranium Management and Policy

- Bill Boyle
  - NE-53
  - Used Nuclear Fuel Disposition Research and Development
    - Used Fuel Disposal R&D
    - Deep Boreholes
    - High Burnup Fuel Demonstration

- Open
  - NE-5 NFST
  - Nuclear Fuel Storage and Transportation Planning Project
    - Integrated Waste Mgmt. System
Consent-Based Siting

On March 24, President Obama authorized the Energy Department to move forward with planning for a separate repository for high-level radioactive waste resulting from atomic energy defense activities.

- Actions the Department will undertake
  - Planning for a defense-only repository
  - Moving forward with planning for interim storage of commercial spent fuel
  - Moving forward with a consent-based siting process for both types of facilities

- Request feedback from communities, Tribes, states and other interested stakeholders on the consent-based siting (CBS) process
- DOE to host a series of public meetings to engage the public and discuss the development of a CBS approach to managing the nation’s nuclear waste
- Submittal of comments - due by June 15, 2016
- Release of draft report compiling comments along with input from public meetings in summer 2016
DOE is moving forward with planning for an integrated waste management system based on CBS

- Protect the nation’s citizens, communities, and the environment
- Built on collaboration with the public, stakeholders, and governments at the local, state, and tribal levels

DOE will conduct a CBS process in multiple phases

- Engage with the public and interested groups to learn from them what elements are important to consider when designing a CBS process
- Focus on documenting a CBS process to serve as a framework for collaborating with potentially interested host communities
- Use the resulting CBS process to work with interested communities and ultimately begin siting facilities
Projected Volumes of Commercial SNF, DOE-Managed SNF, and DOE-Managed HLW, in m$^3$

Commercial and DOE-Managed HLW and SNF

- Commercial SNF: 183,896 m$^3$, 85%
- DOE SNF and HLW: 33,424 m$^3$, 15%

DOE-Managed HLW and SNF

- DOE HLW: 25,260 m$^3$, 12%
- DOE SNF (includes naval SNF): 7,165 m$^3$, 3%

DOE-Managed HLW

- Treated sodium-bonded fuel wastes: 721 m$^3$, 3%
- Vitrified Cs-Sr capsules: 453 m$^3$, 2%
- Sodium-bearing waste: 132 m$^3$, <1%
- WVDP HLW glass: 245 m$^3$, 1%
- Germany HLW glass: 3 m$^3$, <1%
- Existing SRS HLW glass: 2,969 m$^3$, 11%
- Projected SRS HLW glass: 3,988 m$^3$, 15%
- Projected Hanford HLW glass: 14,089 m$^3$, 54%
Waste Packages

Proposed Hanford HLW canister

SRS HLW canister

Dual-purpose canister for commercial SNF, inside storage cask

Spent fuel assemblies

Dual-purpose canister

Storage cask

Cesium/Strontium capsule

Source: Assessment of Disposal Options for DOE-Managed High-Level Radioactive Waste and Spent Nuclear Fuel, October 2014
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<th>Subprogram</th>
<th>FY 2015 Enacted</th>
<th>FY 2016</th>
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<td>(dollars in thousands)</td>
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<td>Total</td>
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Objective: Plan for SNF storage

- Generic Storage Facility Designs
  - Pilot Interim Storage Facility and topical safety analysis report (TSAR)

- Functional and Operational Requirements
  - ASME Acceptance criteria

- Environmental Considerations

- Regulatory Considerations
Objective: Prepare for large-scale transport of SNF to commence within 10 years

- Engagement with Tribes and states
  - Cooperative Agreements, Transportation Core Group, NTSF, ad hoc Working Groups
  - 180(c) Policy, SNF Rail/Routing, Planning Framework

- Transportation Operations
  - Shutdown site visits
  - START web-GIS tool - https://gis.inl.gov/START

- Hardware
  - S-2043 Railcar – design
DOE is developing a railcar to comply with the Association of American Railroads (AAR) S-2043

August 2015 – DOE signed a contract with AREVA Federal Services
- Subcontractors – KASGRO rail, Transportation Technology Center Inc. (TTCI)
- Navy S-2043 railcar team

Contract covers design, analysis and prototype fabrication

There will be future solicitations for prototype testing and large-scale fabrication
## Projected Railcar Timeline

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NFST Reports

- Updated Shutdown Sites Report, May 2015
- Routing Paper, July 2015
- Rationale for the Performance Specification for STAD, July 2015
- Initial Standardized Canister System, Sep. 2015
- Generic Design Alternatives for Dry Cask Storage, Oct. 2015
- Generic Design for Small Size STAD, Oct. 2015
- Operational Requirements for STAD, Oct. 2015
- STAD Canister Feasibility Study, Dec. 2015
- Spent Nuclear Fuel Transportation Cask Design Study, Dec. 2015
- Cask Design Study Final Report, Dec. 2015
NFST reports & documents available on CURIE Website
http://curie.ornl.gov/
Questions?

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Backup
Extended Storage & Subsequent Transportation: R&D Gap Analyses & R&D Priorities

DOE, NRC, NWTRB, EPRI and others have identified and prioritized technical gaps

• **NWTRB:**
  • Evaluation of the Technical Basis for Extended Dry Storage and Transportation of Used Nuclear Fuel

• **NRC:**
  • Identification and Prioritization of the Technical Information Needs Affecting Potential Regulation of Extended Storage and Transportation of Spent Nuclear Fuel

• **UFD R&D Campaign Focus:**
  • Conducting Gap Analysis to Support Extended Storage of Used Nuclear Fuel
  • Used Nuclear Fuel Storage and Transportation Data Gap
  • Prioritization
The Cask Storage Demonstration contract was awarded to the EPRI Team to evaluate extended storage of high burnup used nuclear fuel:

- North Anna Nuclear Power Plant

- AREVA Federal Services
- AREVA Transnuclear
- AREVA Fuels
Evaluation of degradation mechanisms relevant to long-term storage and subsequent transportation:

- Effects of hydride formation and reorientation on the material properties of high-burnup cladding
- Corrosion of stainless steel canisters
- Thermal history of used fuel in storage
- Thermal profiles of dry storage systems
- Mechanical loads on fuel assemblies during normal conditions of transport
Purpose: to understand the of degradation mechanisms over extended periods of time

- Loading a demonstration TN-32B cask with high burn-up fuel
- Drying of the cask contents using typical process
- Dry storage and monitoring at the North Anna site
- Extracting, shipping, and examination of “sister” rods
- Future: cask opening and examination of rods
- Coordinated with NRC
- Conducting R&D to close technical gaps germane to both the initial transportation of SNF and any subsequent transportation that would be required after interim storage

- Understanding “aging management” during interim storage and would provide part of the bases for subsequent transported to a repository

- Aging management under development
  - Evaluating of degradation during storage
  - Generic pilot interim storage facility design and Topical Safety Analysis Report for submittal to the NRC to address aging management and other regulatory issues in advance of site-specific licensing