U.S. DEPARTMENT OF ENERGY

DOE's Integrated Program for the Management and Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste

Office of Nuclear Energy

John Kotek

Assistant Secretary for Nuclear Energy, Acting

U.S. Department of Energy

August 24, 2016

NWTRB Questions

i. *Describe the objectives and status of DOE's Integrated Waste Management System directed by the DOE-NE Office of Fuel Cycle Research and Development.*

ii. *How does DOE-NE coordinate its commercial SNF activities with DOE Office of Environmental Management (DOE-EM) activities to store, process, and prepare DOE-managed spent nuclear fuel (SNF) and high-level radioactive waste (HLW) for disposal?*

   a. *Do the DOE SNF Working Group and the DOE Tank Waste Corporate Board consider integration issues among DOE-NE, DOE-EM, and Naval Reactors? If so, please provide examples.*

iii. *What are the priorities in fiscal years 2017 and 2018 for the DOE Integrated Waste Management System?*

NWTRB Questions (cont'd)

iv. *Generally, how does DOE-NE address recommendations from the Board? More specifically, how has DOE-NE addressed the Board's recommendations on storing and transporting casks and canisters for commercial SNF? See the Board letters to DOE-NE dated:*

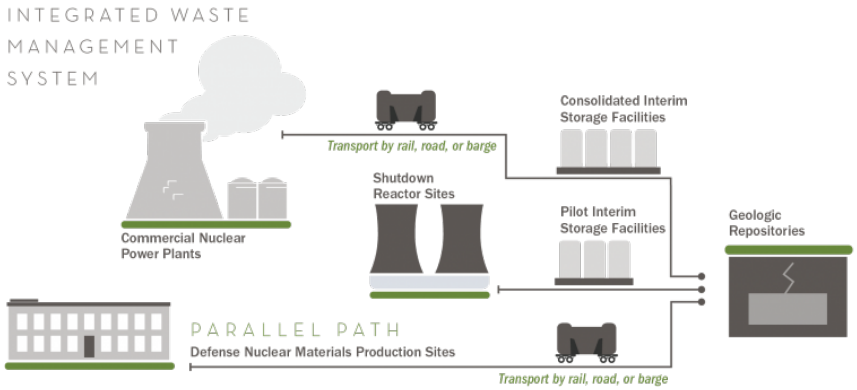
   a. *January 29, 2014 (re Board Meeting of Nov. 20, 2013, on DOE-NE research and development programs).*
   b. *October 10, 2014 (re Board Meeting of Aug. 6, 2014, on DOE SNF management).*
   c. *August 31, 2015 (re Board Meeting of Jun. 24, 2015, on commercial SNF transportation).*

Outline

- Introduction
- Overview of the Integrated Waste Management System (IWMS)
  - Objectives
  - Key elements
  - Various types of containers
- DOE-NE organization for managing IWMS work
- Current Status of IWMS efforts
- Focus Areas and FY17 Priorities
- Inter-office Coordination and Technical Integration
  - Coordination Between NE, EM, and Other DOE Offices
- Addressing Recommendations from the NWTRB
- Summary

Integrated Waste Management System Objectives

- The Department of Energy (DOE) is planning for an IWMS to transport, store, and dispose of our nation's SNF and HLW
- We aim to implement a flexible IWMS incrementally to:
  - Ensure safe and secure operations
  - Gain trust among stakeholders
  - Adapt operations based on lessons learned
- To support this system, the United States will need robust capabilities in the transportation, storage, and disposal of SNF and HLW

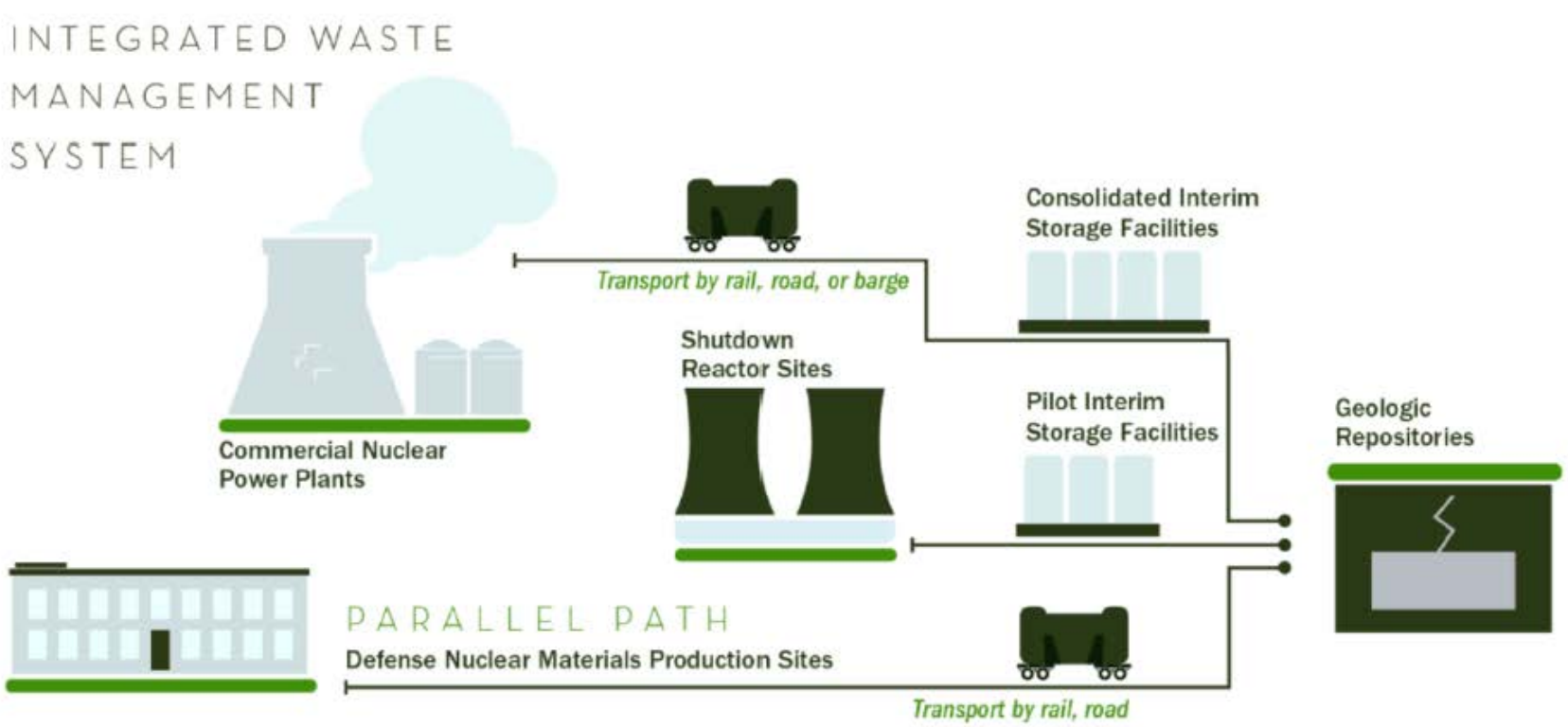


Integrated Waste Management System Elements

- An IWMS consists of facilities and other key infrastructure needed to safely manage both SNF and HLW from commercial electricity generation, as well as national defense activities

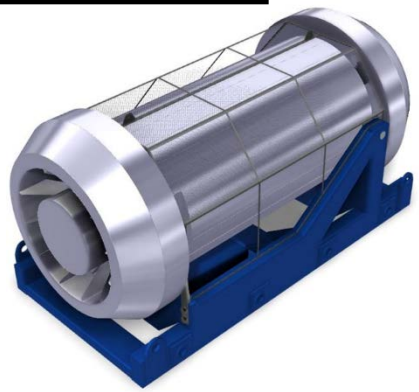
- DOE envisions an IWMS that may contain:
  - pilot interim storage facilities (ISFs), initially focused on accepting SNF from shutdown reactor sites;
  - full-scale, consolidated ISFs that provide greater capacity and flexibility within the waste management system;
  - geologic repositories for SNF and HLW, including consideration of a separate repository for defense waste; and
  - transportation infrastructure to move SNF and HLW by rail, road, and barge

Integrated Waste Management System



Various Types of Commercial SNF Containers in an IWMS*

- SNF in Canisters
  - Can be single-, dual-, or triple-purpose for storage, transport, and/or disposal
- Canistered SNF in
  - Storage Overpacks/Casks
  - Transportation Overpacks/Casks
  - Disposal Overpacks/Waste Packages
  - Dual-Purpose Overpacks (Storage and Transport)
- Non-canistered SNF ("Bare Fuel") in
  - Storage Casks
  - Transportation Casks
  - Dual-Purpose Storage & Transportation Casks



Commercial SNF Containers to be discussed further in the presentation by Joe Carter (SRNL)

*On this slide and in system analysis studies, the IWMS is viewed from a national perspective to further DOE-NE's objective to develop a suite of options and set of supporting analyses that will enable future informed choices about how best to manage SNF and HLW. This construct and analyses should not be interpreted as a statement of DOE policy as to how it intends to fulfill its acceptance obligation under the Standard Contract for Disposal of SNF and/or HLW, 10 CFR Part 961. To the extent discussions and any recommendations in this report conflict with the provisions of the Standard Contract, the Standard Contract provisions prevail.

Other Types of Containers in an IWMS

- Containers for DOE-Managed SNF and HLW
  - Primarily for SNF and HLW from defense nuclear materials production, some material of commercial origin, some from civilian R&D activities

Past work on DOE-Managed SNF and HLW to be discussed in afternoon presentations by DOE-EM

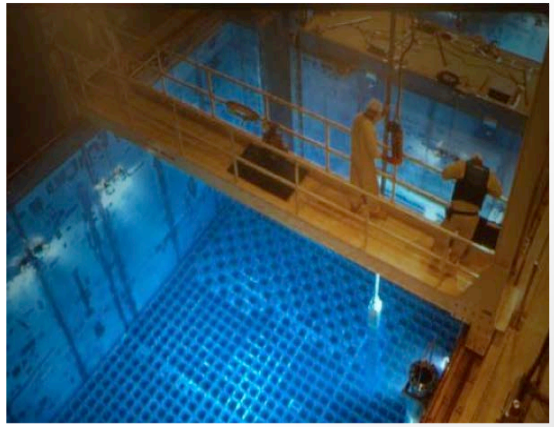
Empty canister for the Savannah River glass waste form
http://www.aecom.com/projects/savannah-river-site/

http://energy.gov/em/articles/em-s-west-valley-cleanup-finds-success-history-making-waste-relocation

U.S. Department of Energy Office of Nuclear Energy (DOE-NE)

- Administration's Strategy called for a new Waste Management and Disposal Organization (MDO), a new organization separate from DOE
- Currently, DOE-NE leads IWMS efforts, coordinates with other offices
- Organizationally, DOE-NE proposing to elevate office responsible for IWMS
- Planning for new Nuclear Energy Advisory Committee (NEAC) subcommittee focused on waste management

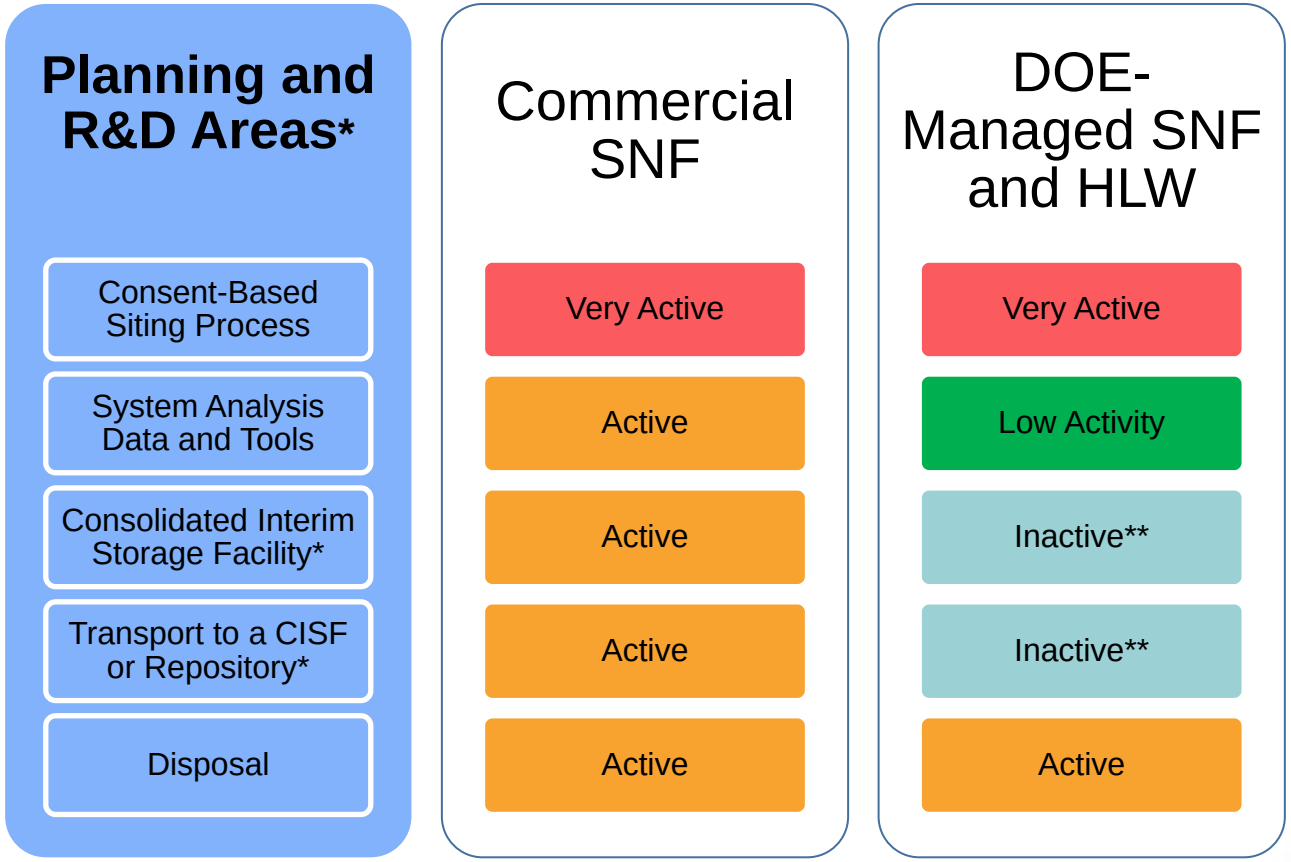
https://www.blsmeetings.net/NRC2011StateLiaisonConference/presentations/EastonDryCaskStorage.pdf



https://curie.ornl.gov/sites/default/files/private/node_gallery/pool1.png

IWMS Planning and R&D Status

FY16 Focus is on Consent-Based Siting, Commercial SNF (Shutdown Sites)



*ISF, disposal, and transport activities are generic, and not site specific
**Inactive in FY16, but factored into out-year planning activities

Status of IWMS Efforts: Consent-Based Siting Public Meetings

LOCATION	DATE
Chicago, IL	March 29
Atlanta, GA	April 11
Sacramento, CA	April 26
Denver, CO	May 24
Boston, MA	June 2
Tempe, AZ	June 23
Boise, ID	July 14
Minneapolis, MN	July 21

Integrated Waste Management System 10-Year Focus and FY17 Priority Areas

- Over the next 10 years, the IWMS focus will be on:
  - Siting, designing, licensing, constructing, and operating a pilot ISF with an initial focus on SNF from shut-down reactor sites;
  - Development of transportation capabilities to facilitate the acceptance of SNF at a pilot interim storage facility; and
  - Advancing toward the siting and licensing of a larger ISF to provide flexibility and reduce expected government liabilities.

- FY17 Priority Areas:
  - Community Involvement in Consent-Based Siting Process
  - Development of generic design and Topical Safety Analysis Report (TSAR) for a pilot interim storage facility
  - Continue design of a prototype American Association of Railroads (AAR) Standard S-2043 railcar for commercial SNF transport

Program Coordination and Technical Integration

- Program coordination
  - **Inter-office Coordination:** Between DOE Offices in developing and implementing IWMS approaches and R&D efforts
  - **External Coordination:** With communities, states, tribes, U.S. Nuclear Regulatory Commission (NRC), utilities, industry, U.S. Congress, various committees/boards/forums, international organizations, etc.

- Technical integration of various container types:
  - **Integration across IWMS functional areas:**
    - Storage, transport, and disposal functional areas potentially can be tightly coupled
    - SNF container package attributes (thermal load, dose rate, etc.) can constrain ability to perform particular functions, and may require others to be performed (repackaging)
    - Uncertainty in future disposal media limits ability to specify upstream activities including container design
  - **Exploring synergies/integration between commercial SNF and defense HLW, SNF**
    - For example, possibly taking advantage of common transportation hardware and infrastructure

Examples of Inter-Office Coordination Between DOE-NE, DOE-EM, and Others

- Personnel Exchanges
  - Personnel with prior work experience in other DOE offices
  - Details from one organization to another
- Periodic Coordination/Working Group Meetings
  - Among senior managers
  - Working Group meetings among managers, staff, field, HQ
    - E.g. Spent Nuclear Fuel Working Group:

      Example of coordination at Idaho Site between EM, NE, Nuclear Naval Power and Propulsion (NNPP) to be provided later on in agenda (Ken Picha's SNF presentation)
- Routine Communication
  - Routine communications between technical managers in conduct of work
    - E.g. between NE and NNPP on railcar development efforts
- Memorandums of Understanding/Agreement (MOUs/MOAs)
  - Developed when necessary to clearly define roles and responsibilities regarding contributions to cooperative efforts

Summary

- IWMS is at an early stage and special emphasis is being placed on development of a consent-based siting process
- Importance of Department-wide coordination and technical integration in developing durable solutions for an IWMS is recognized
- DOE-NE is placing a priority on Spent Fuel and Waste Disposition activities
- Coordination between DOE offices is ongoing and can be expected to increase in future years, particularly with respect to work on DOE-managed SNF and HLW consistent with appropriations
- FY2017 priorities include:
  - encouraging community involvement in the consent-based siting process
  - development of pilot ISF generic design and topical safety analysis report
  - continuation of railcar prototype design efforts