U.S. DEPARTMENT OF ENERGY | Office of NUCLEAR ENERGY

Office of Integrated Waste Management (IWM) Overview

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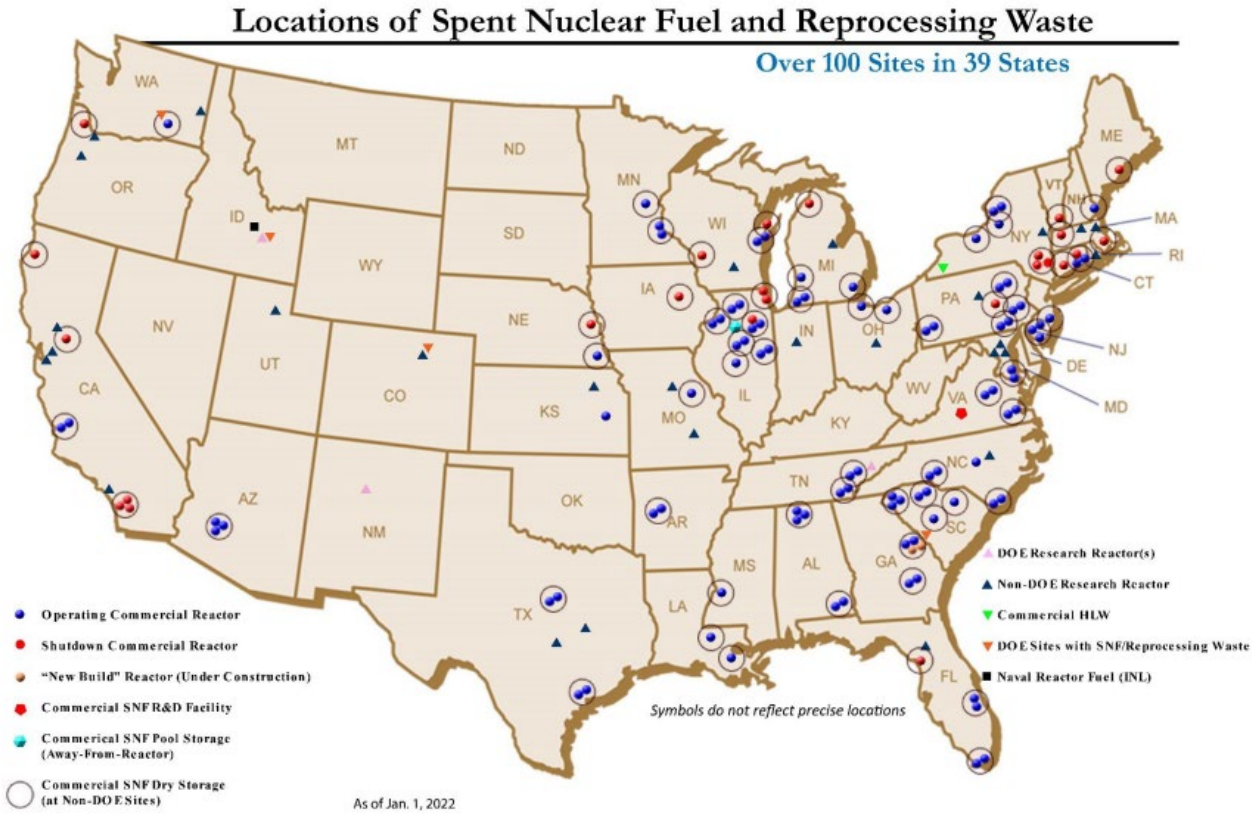
Acting Director
Office of Integrated Waste Management
US Department of Energy

Nuclear Waste Technical Review Board
Spring Public Meeting
March 28th, 2023
Orlando, FL

Legal Disclaimer

- This is a technical presentation that does not take into account contractual limitations or obligations under the Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste (Standard Contract) (10 CFR Part 961).
- To the extent discussions or recommendations in this presentation conflict with the provisions of the Standard Contract, the Standard Contract governs the obligations of the parties, and this presentation in no manner supersedes, overrides, or amends the Standard Contract.
- This presentation reflects technical work which could support future decision making by the U.S. Department of Energy (DOE or Department). No inferences should be drawn from this presentation regarding future actions by DOE, which are limited both by the terms of the Standard Contract and Congressional appropriations for the Department to fulfill its obligations under the Nuclear Waste Policy Act including licensing and construction of a spent nuclear fuel repository.

US Spent Nuclear Fuel in Context



- 1958: US began using commercial nuclear power
- 2023: 92 operating commercial reactors at 53 nuclear power plants in 28 States
  - 20 nuclear power plants have shut down
  - 90,000+ metric tons of spent nuclear fuel
- 2075: US estimated to have ~140,000 metric tons of spent nuclear fuel

Source: US DOE, 2022. Spent Nuclear Fuel and Reprocessing Waste Inventory.

Office of Integrated Waste Management

Mission

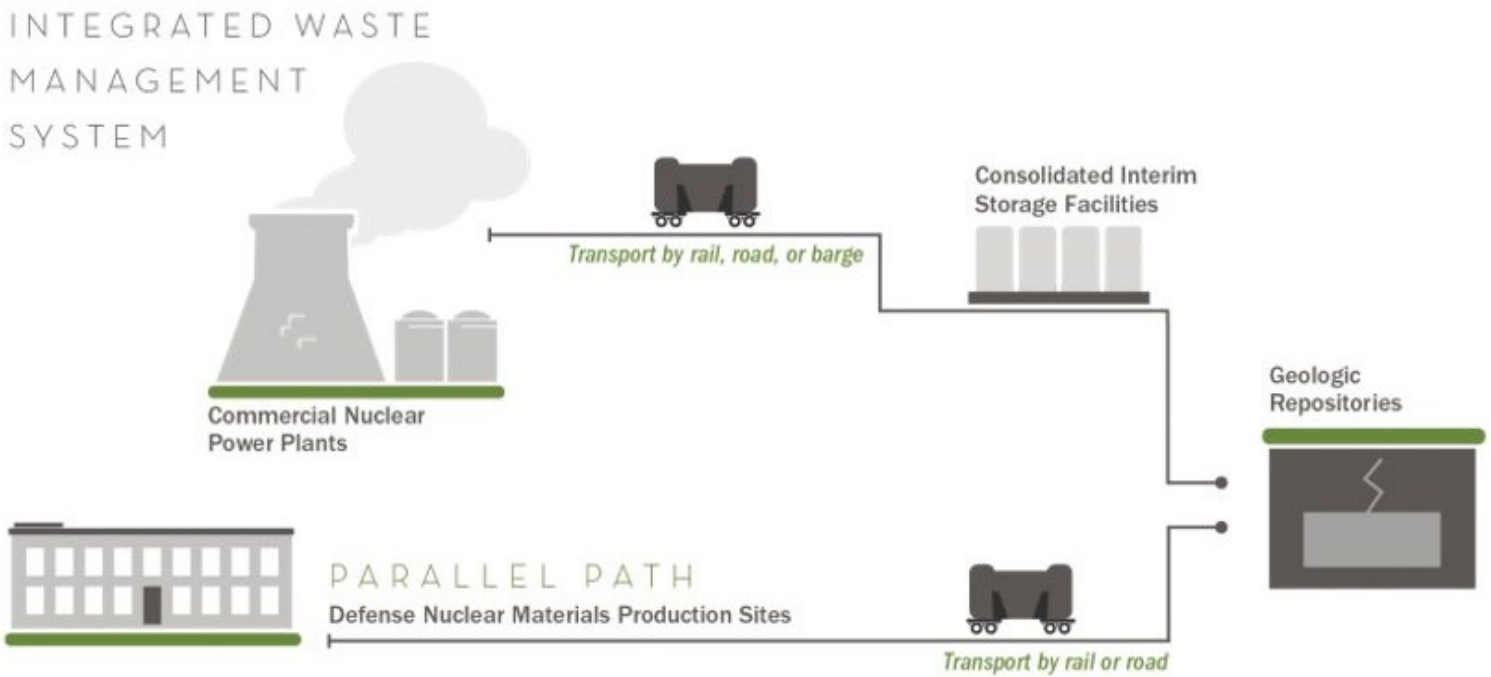
To implement Federal interim storage for commercial spent nuclear fuel following a consent-based siting process.

Congressional Authorization

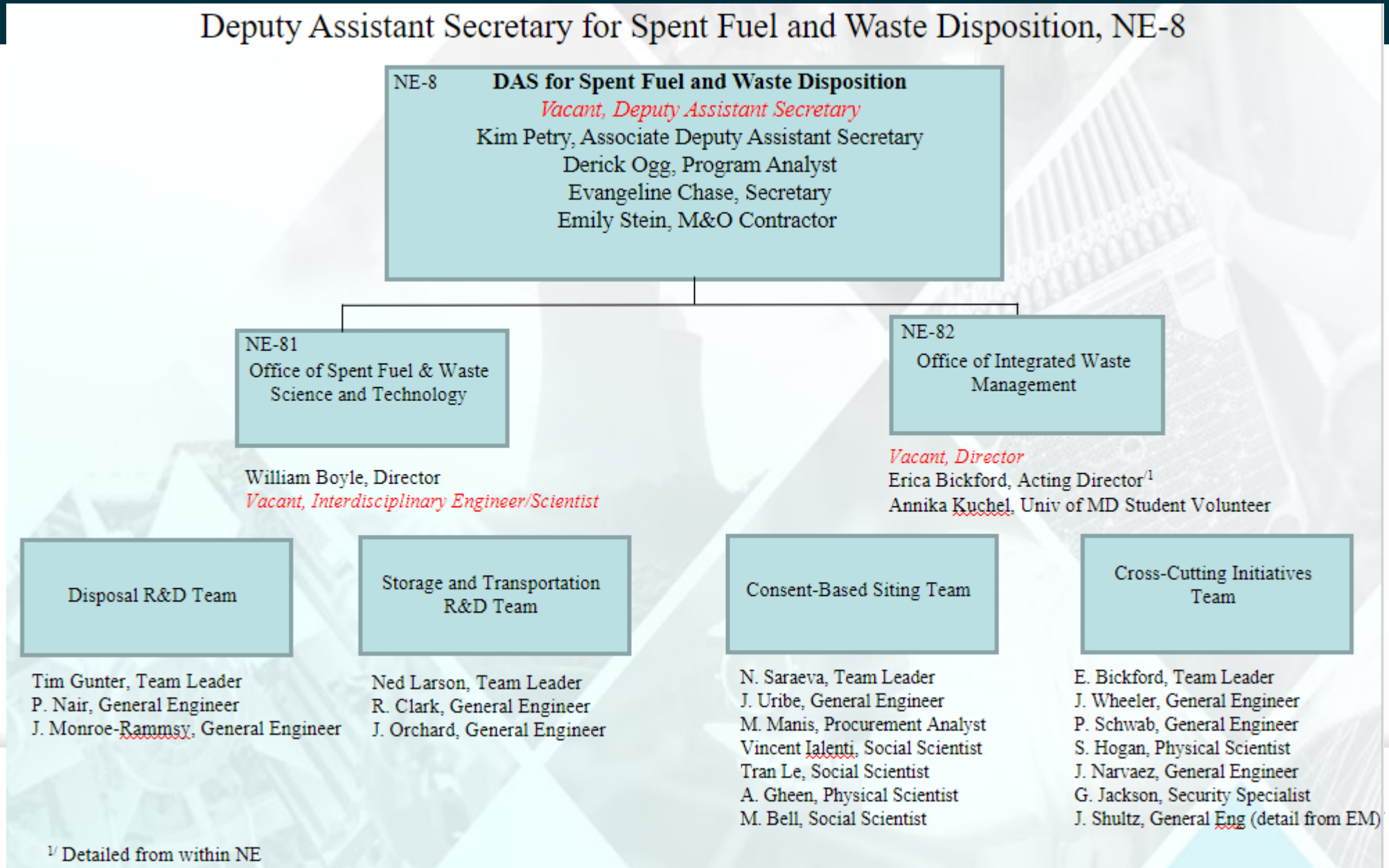
- In the Consolidated Appropriations Act, 2021, Congress provided funds for the Department to move forward on establishing a federal interim storage capability. With this funding, DOE can now pursue activities related to the process for identifying an interim storage site.
  - Included $20 million for interim storage

Integrated Waste Management System

- Storage facility(ies)
- Transportation capability
- Disposal facility(ies)
- Interfaces



Staff Resources IWM



New Staff

Gerry Jackson
Security Specialist

Sara Hogan
Transportation Program Manager

Natalia Saraeva
Team Leader for Consent-Based Siting

Megan Manis
Procurement Analyst

John Shultz
Storage Program Manager (detail)

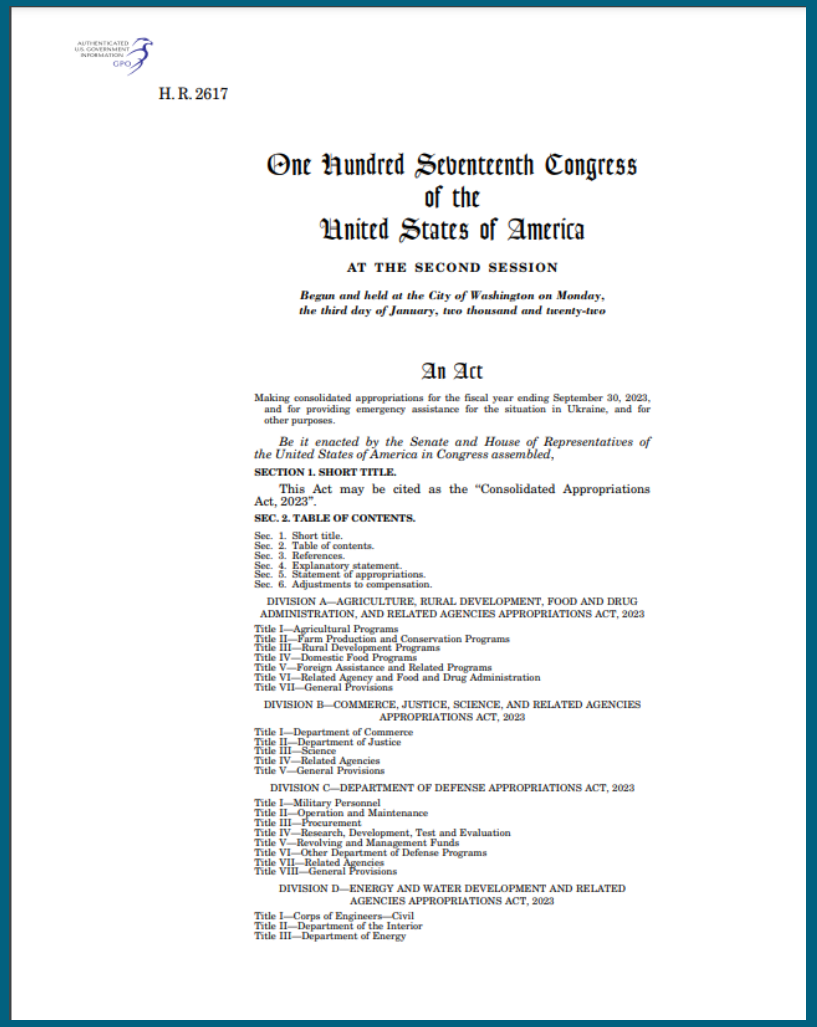
Angelica Gheen
Health Physicist

Tran Le
Social Scientist

Vincent Ialenti
Social Scientist

Marissa Bell
Social Scientist

Annika Kuchel
Spring Intern



H. R. 2617

One Hundred Seventeenth Congress
of the
United States of America

AT THE SECOND SESSION

Begun and held at the City of Washington on Monday, the third day of January, two thousand and twenty-two

An Act

Making consolidated appropriations for the fiscal year ending September 30, 2023, and for providing emergency assistance for the situation in Ukraine, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Consolidated Appropriations Act, 2023".

SEC. 2. TABLE OF CONTENTS.

Sec. 1. Short title.
Sec. 2. Table of contents.
Sec. 3. References.
Sec. 4. Explanatory statement.
Sec. 5. Statement of appropriations.
Sec. 6. Adjustments to compensation.

DIVISION A—AGRICULTURE, RURAL DEVELOPMENT, FOOD AND DRUG ADMINISTRATION, AND RELATED AGENCIES APPROPRIATIONS ACT, 2023

Title I—Agricultural Programs
Title II—Farm Production and Conservation Programs
Title III—Rural Development Programs
Title IV—Domestic Food Programs
Title V—Foreign Assistance and Related Programs
Title VI—Related Agency and Food and Drug Administration
Title VII—General Provisions

DIVISION B—COMMERCE, JUSTICE, SCIENCE, AND RELATED AGENCIES APPROPRIATIONS ACT, 2023

Title I—Department of Commerce
Title II—Department of Justice
Title III—Science
Title IV—Related Agencies
Title V—General Provisions

DIVISION C—DEPARTMENT OF DEFENSE APPROPRIATIONS ACT, 2023

Title I—Military Personnel
Title II—Operation and Maintenance
Title III—Procurement
Title IV—Research, Development, Test and Evaluation
Title V—Revolving and Management Funds
Title VI—Other Department of Defense Programs
Title VII—Related Agencies
Title VIII—General Provisions

DIVISION D—ENERGY AND WATER DEVELOPMENT AND RELATED AGENCIES APPROPRIATIONS ACT, 2023

Title I—Corps of Engineers—Civil
Title II—Department of the Interior
Title III—Department of Energy

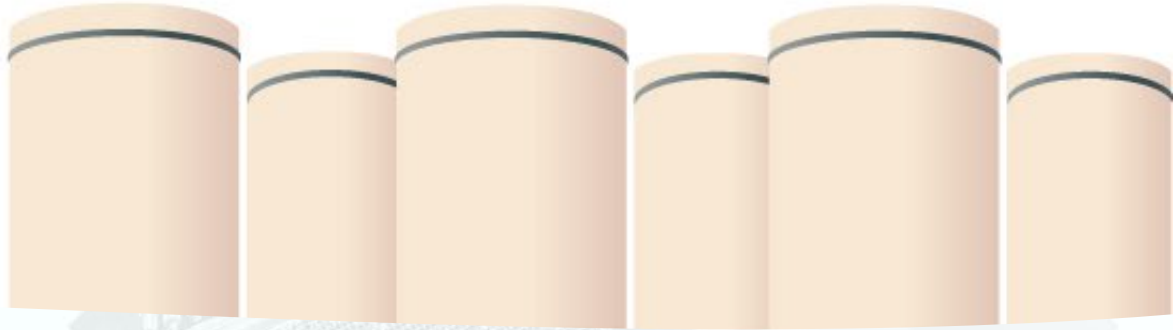
FY23 Appropriations

- **IWM Funded at $53 million**
- Note funding in FY21 and FY22 was split between two pots of funds (for Interim Storage and IWMS) and in FY23 they were combined at DOE's request. The net increase in funding is $15 million.

- Explanatory statement for Integrated Waste Management Systems:
  - The Department is directed to move forward under existing authority to identify a site for a federal interim storage facility. The Department is further directed to use a consent-based approach when undertaking these activities.
  - The Department is directed to continue site preparation activities at stranded sites, to evaluate the re-initiation of regional transport, and to undertake transportation coordination efforts.

IWM FY23 Planned Activities

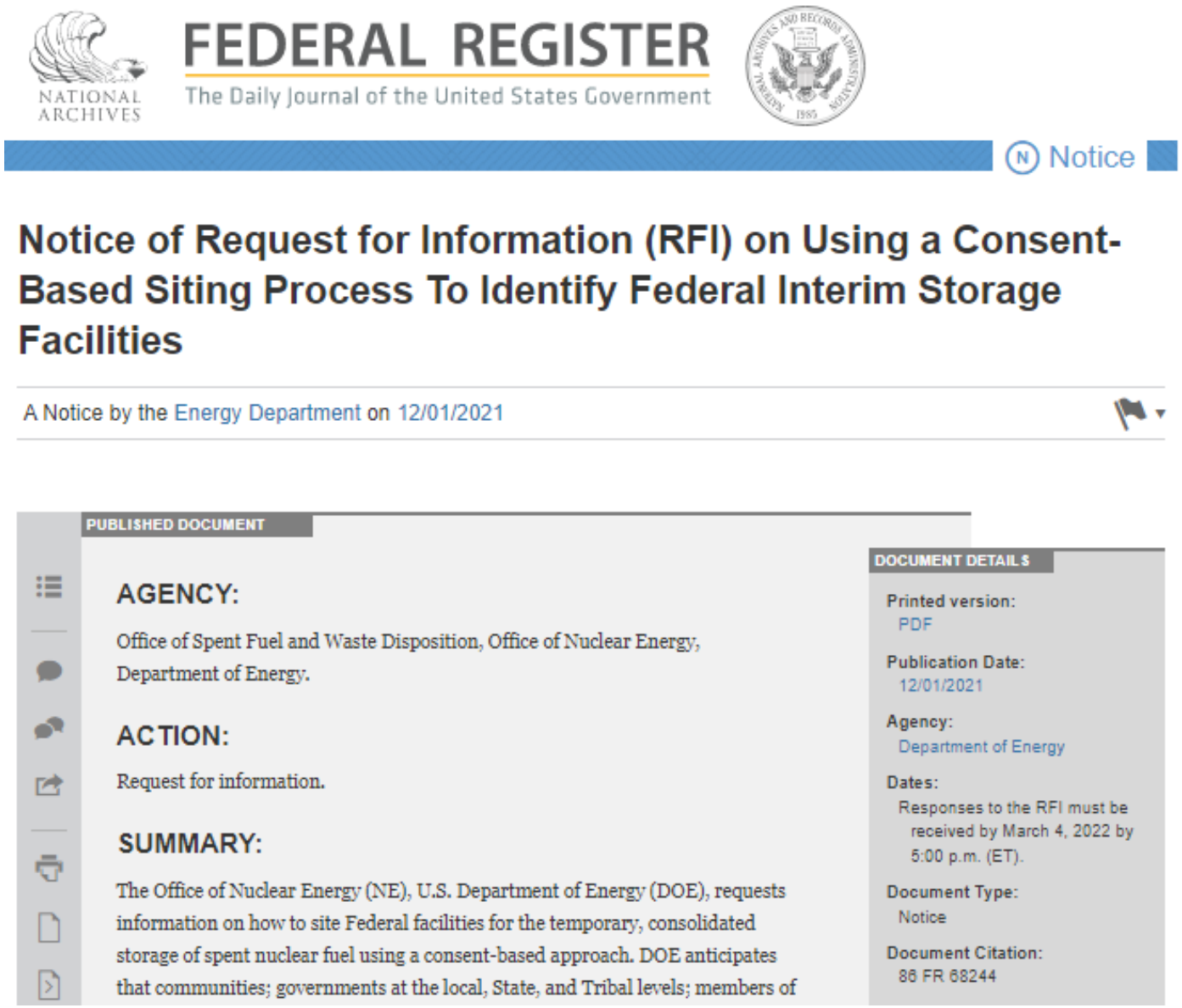
- **Consent-Based Siting**
  - Ramp-up Public Outreach and Stakeholder Engagement
- **Transportation Preparations**
  - Continue and expand on existing work
- **Storage Implementation**
  - Design, project manage, and consider regulatory requirements
- **Systems Analysis**
  - Continue and update existing work



Consent-Based Siting

Request for Information

- Questions on:
  - the consent-based siting process itself
  - removing barriers to meaningful participation—especially for groups and communities who have not historically been well-represented in these conversations
  - interim storage as a component of the nation's waste management system
- Special focus on ensuring issues of equity and environmental justice are built into the consent-based siting process, as well as the waste management system as a whole



NATIONAL ARCHIVES

FEDERAL REGISTER

The Daily Journal of the United States Government

Notice

Notice of Request for Information (RFI) on Using a Consent-Based Siting Process To Identify Federal Interim Storage Facilities

A Notice by the Energy Department on 12/01/2021

PUBLISHED DOCUMENT

AGENCY:

Office of Spent Fuel and Waste Disposition, Office of Nuclear Energy, Department of Energy.

ACTION:

Request for information.

SUMMARY:

The Office of Nuclear Energy (NE), U.S. Department of Energy (DOE), requests information on how to site Federal facilities for the temporary, consolidated storage of spent nuclear fuel using a consent-based approach. DOE anticipates that communities; governments at the local, State, and Tribal levels; members of

DOCUMENT DETAILS

Printed version:
PDF

Publication Date:
12/01/2021

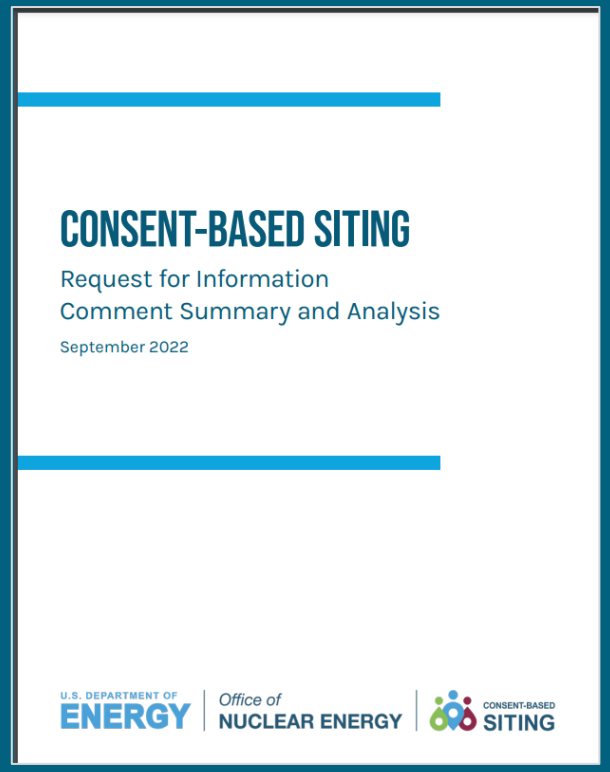
Agency:
Department of Energy

Dates:
Responses to the RFI must be received by March 4, 2022 by 5:00 p.m. (ET).

Document Type:
Notice

Document Citation:
86 FR 68244

Summary of RFI Feedback



energy.gov/consent-based-siting

~225 comments received from the following:

- **Tribes: 3 from Tribal groups, 3 from Tribes**
- **States: 12 from State government organizations, 3 from State Regional Groups, and 3 from groups representing State governments or their interests**
- **Local governments: 7**
- **NGOs: ~35**
- **Environmental Justice organizations: 2**
- **Industry: ~12**
- **Members of Academia: ~7**
- **Labor Union: 1**
- **Private Citizens: ~132 (including 45 “form” letters)**

Funding Opportunity Informed by Public Feedback

“Funding to Participate: Funding and technical assistance should be provided to Tribes to participate in all stages of the CBS process. Tribes often do not have the same resources, staff capacity, or time as states, so DOE must take proactive steps to ensure that Tribes can participate in the process.”

– Tribal Representatives

“Extensive outreach activities and financial support for interested communities to learn for themselves. Funding should be provided as soon as possible.”

– Private Citizen

Quoted text from Responses to the Request for Information (86 FR 68244)
Available at **energy.gov/consentbasedsiting**

Funding Opportunity Announcement

- ~~**$16 million**~~**$26 million; 6-16 awards; performance period is 18-24 months.**
- **Eligible awardees include:**
  - Higher-education institutions (colleges, universities, and other institutions of higher learning)
  - Tribal, State, and local governments (municipalities, towns, cities, and counties)
  - Community foundations
  - Non-governmental organizations (trade associations, 501(c)(3) organizations, and other public groups)
- **Geographically and institutionally diverse awardees**
  - Across the continental United States
- **Builds Capacity For Future Engagement**
  - Establishes a community of practice
  - Strengthens involvement and mutual learning aimed at building trust
  - Special focus on environmental justice
- **Awardees expected to be announced in late spring 2023**

Public Feedback is Informing Next Steps in Consent-Based Siting

1

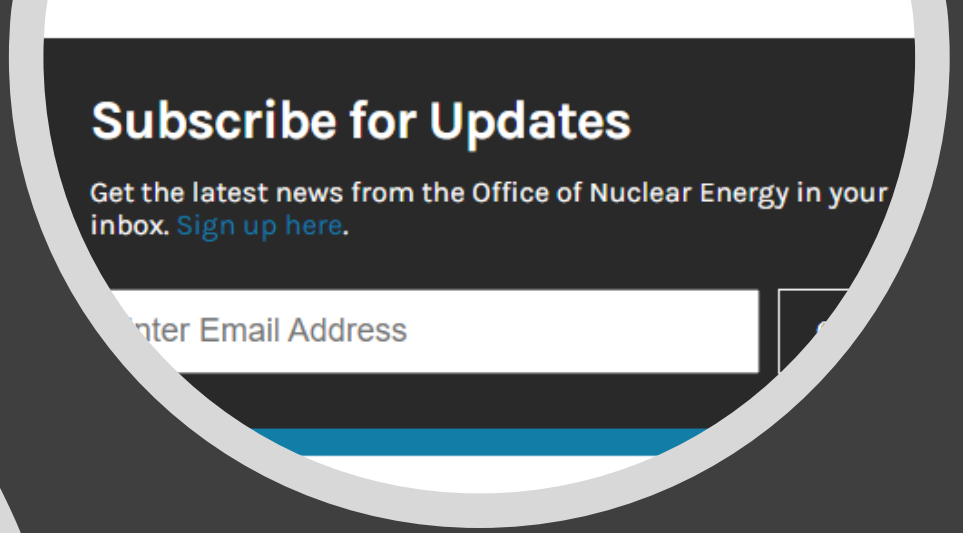
Further developing consent-based siting process

2

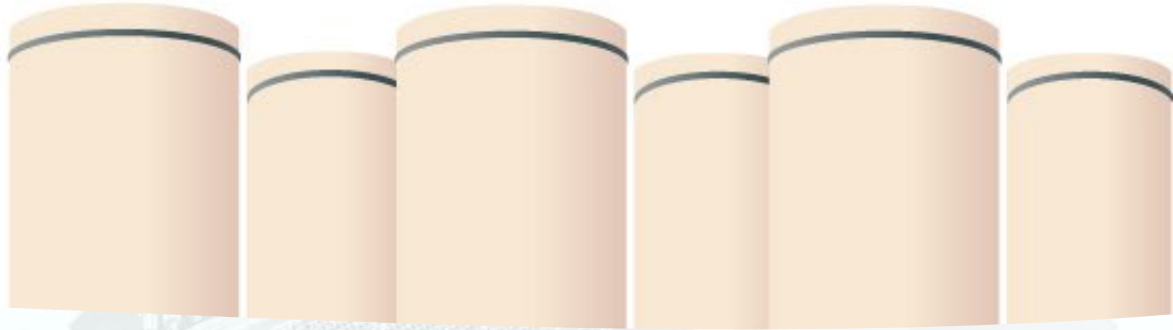
Implementing funding opportunity for interested groups and communities to learn more

3

Clarifying our broader strategy for an integrated waste management system



More information at energy.gov/consent basedsiting



Cross-Cutting Initiatives

Transportation Project Updates Railcar Development

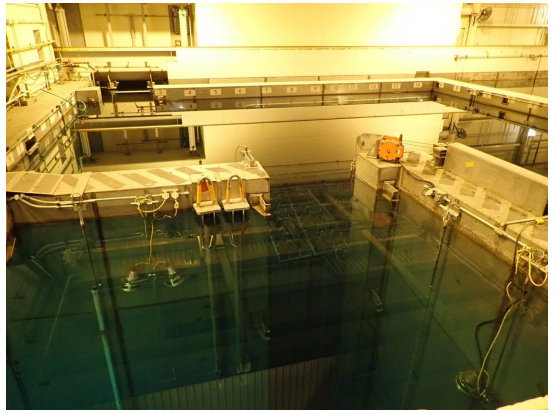
Atlas Railcar with Light Mock-up Load, October 2019

- **Atlas** (12-axle) railcar: continuing multiple railcar testing– expected to be completed in 2023
- **Buffer railcar**: developed in conjunction with the Atlas railcar and will be part of multiple-railcar testing along with Rail Escort Vehicle (**REV**)
- **Fortis** (8-axle) railcar: contract signed and design and fabrication kick-off events (Sept 2022)
- Continue developing integrated security & safety monitoring system (**ISSMS**) for railcars

Transportation Project Updates

Infrastructure Evaluations and Operational Planning

- **Nuclear Power Plant Infrastructure Evaluations for Removal of Spent Nuclear Fuel**
  - https://www.energy.gov/ne/articles/nuclear-power-plant-infrastructure-evaluations-removal-spent-nuclear-fuel
  - 20 site visits completed to date
  - New report to be published in 2023
- **Site-Specific De-Inventory Reports**
  - Available on www.osti.gov
  - Maine Yankee, Connecticut Yankee, Humboldt Bay, Big Rock Point, Kewaunee, Trojan
  - 5 more to be published in 2023
- **Security Considerations**
  - Transload site security needs
  - Escort/courier security options and requirements



GE Hitachi Morris Operation Spent Fuel Pool, May 2022

Rail spur condition near GE Hitachi Morris Site, May 2022

Indian Point ISFSI, July 2022

Palisades ISFSI, October 2022

Transportation Project Updates

Engagement with Tribes and States

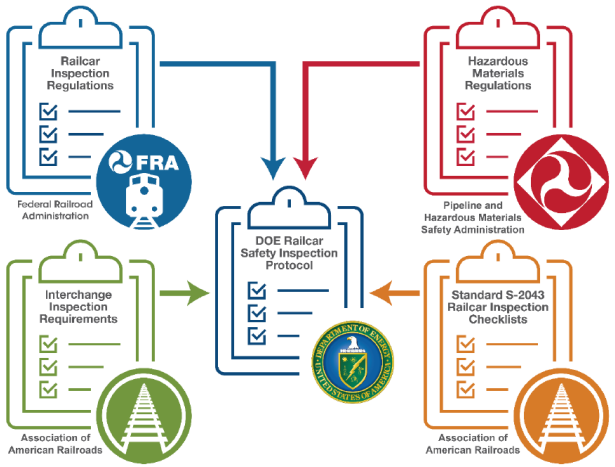
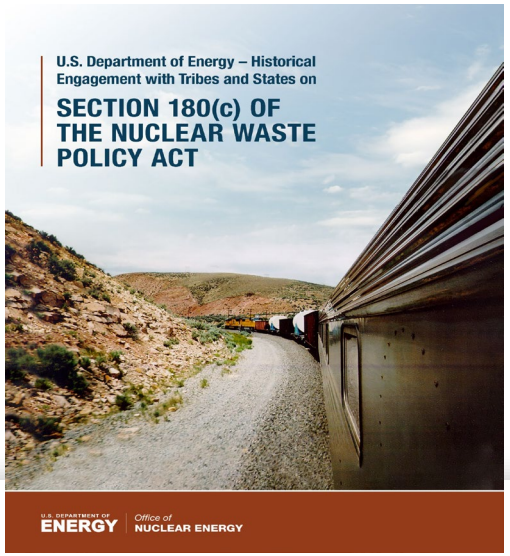


Figure S-1. Components of DOE Railcar Safety Inspection Protocol



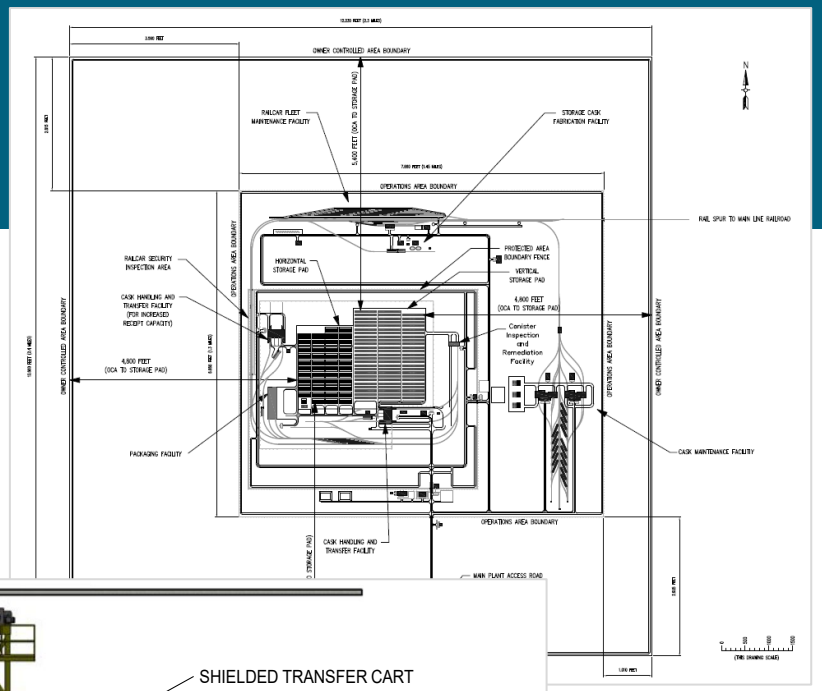
- **IWM funds 5 cooperative agreements with State Regional Groups and the Tribal Radioactive Materials Transportation Committee**
  - Supports regional and Tribal committee operations and staff support
  - Supports mid-year meetings
  - Supports participation in DOE's National Transportation Stakeholders Forum (NTSF) Annual Meeting and other DOE-hosted meetings
  - Supports travel to relevant trainings and technical meetings
- **Activities**
  - **IWM federal staff lead three NTSF ad hoc working groups**
    - Section 180(c) ad hoc working group
    - SNF Rail/Routing ad hoc working group
    - SNF Management communications and outreach ad hoc working group
  - **IWM leads a Transportation Core Group**
    - Comprised of chairs/co-chairs/executive committees of State Regional Groups and Tribal Radioactive Materials Transportation Committee

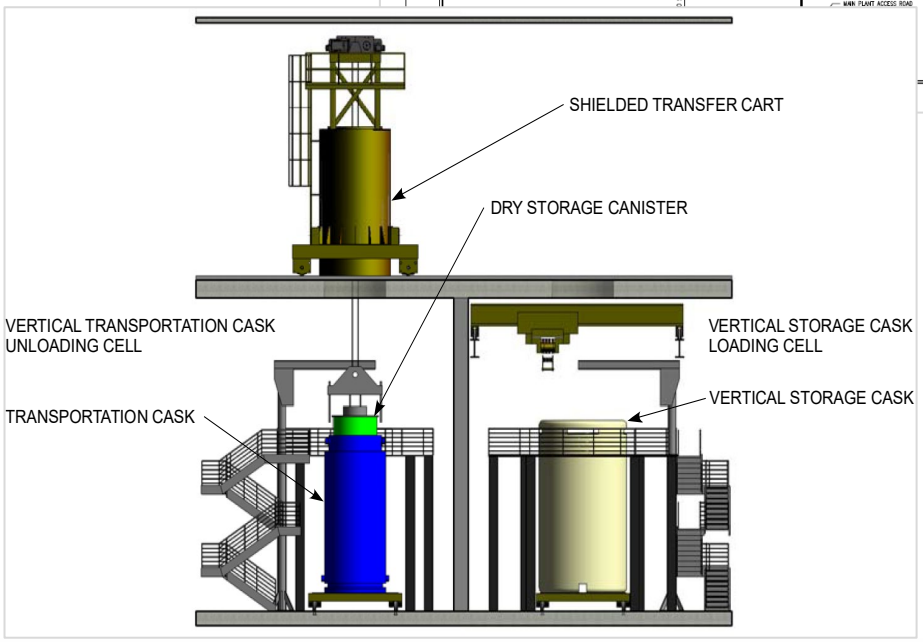
Transportation Project Updates Package Performance Study

- Developing preliminary plans for a **full-sized rail cask package test** (actual testing will depend on funding).
  - DOE will lead, and invite NRC to participate
- US has not tested a current full-sized SNF transportation cask
- Endorsed by National Academy of Sciences and the Blue Ribbon Commission
- Test will include regulatory tests (unyielding surface) and DOE is also considering non-regulatory (e.g., train collision, waterbody retrieval demonstration)
- Goals include building public trust and confidence in the safety of SNF transportation casks and SNF transportation by rail and gathering technical data

Storage Facilities & Equipment

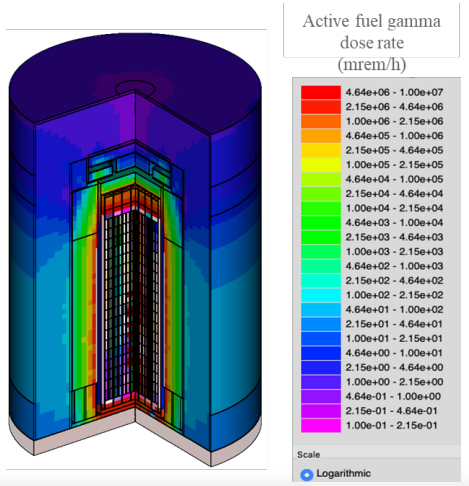
- **Project management for a federal consolidated interim storage facility**
  - DOE critical decision process for capital projects
- **Storage Facility Design**
  - Functions and requirements
  - Reference design concepts
  - Regulatory analysis
- **Canister inspection and remediation concepts**
  - Helium leak testing

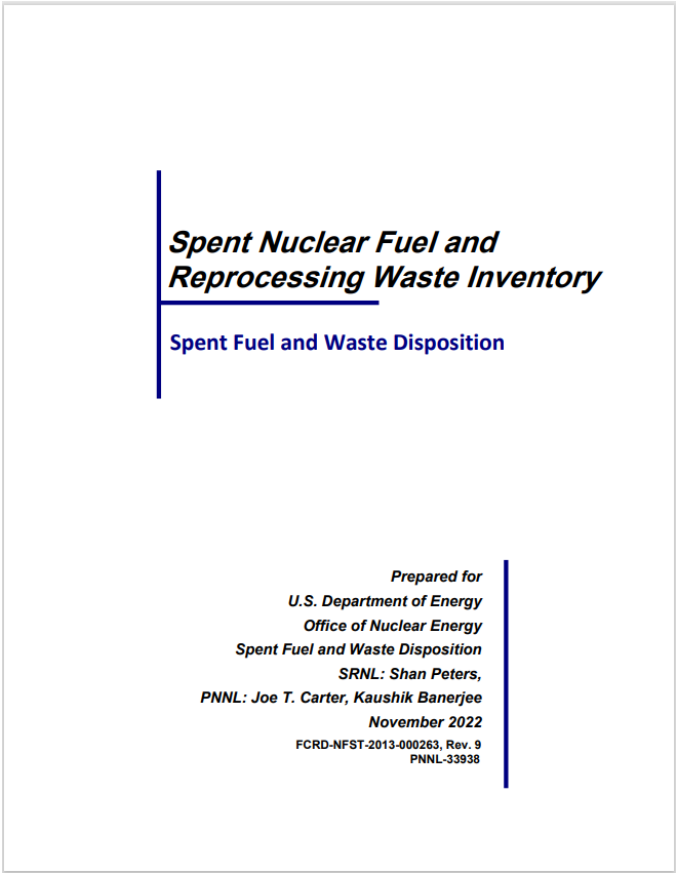




System Analysis and Integration

- **Computational Tools, Data Management, and Modeling & Simulation**
  - PASO
  - NGSAM
  - UNF-ST&DARDS
  - SNF annual inventory update
    - https://curie.pnnl.gov/document/spent-nuclear-fuel-and-reprocessing-waste-inventory-revision-9
- **Systems Engineering**
  - IWM functions and requirements
  - System throughputs
  - Standardization considerations
  - Advanced Reactor SNF considerations





PASO and NGSAM System Analysis Tools

PASO (Performance Assessment of Strategic Options)

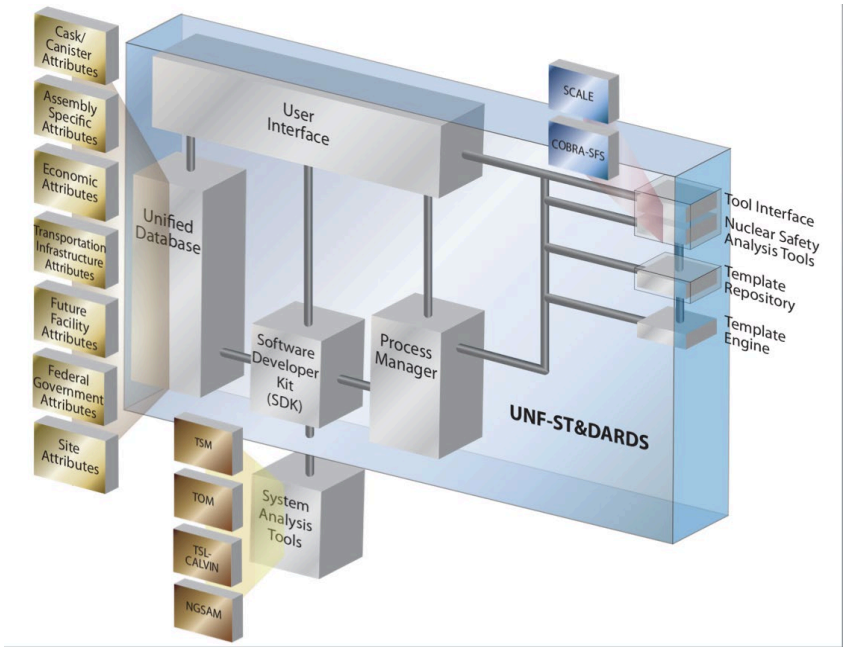
- Integrates all of the milestones that need to successfully deploy an Integrated Waste Management System
  - Focus has been on consolidated interim storage and the transportation system
  - Considers a range of possible deployment approaches
  - Explicitly includes uncertainty in activities duration and costs
  - Explicitly includes programmatic risks
  - Provides estimated deployment timelines (including critical path) and costs

NGSAM (Next Generation System Analysis Model)

- Enables the evaluation of future integrated waste management scenarios.
  - Models the backend (transport, storage, and disposal) for SNF and high-level radioactive waste
- Allows detailed customization options such as storage facilities (wet/dry), packaging options, costs, throughputs, and transportation assets.

Integration Between System Analysis Tools

- START provides routes for use in NGSAM
- The Unified Database of UNF-ST&DARDS provides data used in NGSAM
  - Canister types
  - Actual and projected assembly inventories
  - Actual canister inventories and as-loaded configurations
  - Heat projections over time for transportation CoC thermal limit checks
- Results from PASO scenarios inform assumptions used in NGSAM modeling
  - Available transportation assets
  - Projected facility open dates



Looking Ahead

Consent-based siting and addressing societal challenges

Need for a disposal pathway

Extended storage research

Foreseeing waste management from advanced reactors deployment

Knowledge management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