



# Spent Nuclear Fuel (SNF) Program

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# SNF Facilities



Idaho Nuclear Technology and Engineering Center



Fort St. Vrain, Colorado



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# SNF Regulatory Milestones

## ID Settlement Agreement – 10/17/1995

DOE shall complete the transfer of all spent fuel from wet storage facilities at INEL by December 31, 2023 (Paragraph E.8)

DOE shall remove all spent fuel including naval spent fuel and Three Mile Island spent fuel from Idaho by January 1, 2035 (Paragraph C.1)

## Colorado Agreement – 2/13/1996

DOE committed to shipping the spent nuclear fuel located at the Installation\* out of Colorado by no later than January 1, 2035 (Paragraph A.2)

\* Fort St Vrain (FSV) Independent Spent Fuel Storage Installation (ISFSI)



# SNF Overview

- **INL currently maintains the most diverse inventory of SNF in the DOE Complex**
  - About 220 specific fuel types
  - 268 MTHM or 51% (by volume) of DOE fuel
- **During the period 1997 - 2035, the EM SNF Program will have managed:**
  - Mass = 304.5 MTHM
  - Volume = 750 m<sup>3</sup>
  - Items = 32,820 FHUs of SNF
- **Facility management**
  - 5 facilities located onsite
  - 1 former commercial facility located offsite (Fort St. Vrain, CO)

Facility	Location	Managed
CPP-603	Onsite	DOE Order
CPP-666		
CPP-749		
CPP-2707		
CPP-1774	Onsite	NRC License
FSV ISFSI	Offsite	





# SNF by Facility

- Irradiated Fuel Storage Facility at CPP-603
  - Commissioned in 1974
  - 636 Storage locations (93% full, 2.6% unavailable)
- CPP-666 Wet Storage
  - Fuel first brought in April 1984
  - The 3,500,000-gallon pool currently at 6.5% fuel capacity
  - 2 Fuel types remaining (EBR-II and ATR)
- Underground Storage at CPP-749
  - First Generation Vaults: Commissioned in 1970, 88% full
  - Second Generation Vaults: Commissioned in 1984, 45% full
- Storage Pad at CPP-2707
  - 8 storage casks with various commercial fuels
- TMI-2 Independent Spent Fuel Storage Installation at CPP-1774
  - Horizontal storage modules, 97% full
- Fort St. Vrain Independent Spent Fuel Storage Installation
  - DOE took responsibility for the facility in 1996, 99% full



# SNF in Wet Storage

- EBR-II Fuel
  - Sodium bonded stainless steel clad fuel
  - Cut and containerized in bottles at Argonne National Laboratory and sent to INTEC
- ATR Fuel
  - Aluminum clad fuel from the Advanced Test Reactor
  - ATR has a long-term mission that requires fuel storage for continued operation
  - The INTEC SNF Project has designed higher density ATR fuel storage buckets which will allow for continued ATR operations until approximately 2028
- Navy
  - Project transferred fuel back to the Naval Reactors Fuel Facility at the INL for packaging
  - Project completed in January 2019



SNF Crew transferring EBR-II fuel to the cask loading pool

**All EM-Owned Fuel in Dry Storage  
as of June 6, 2010**

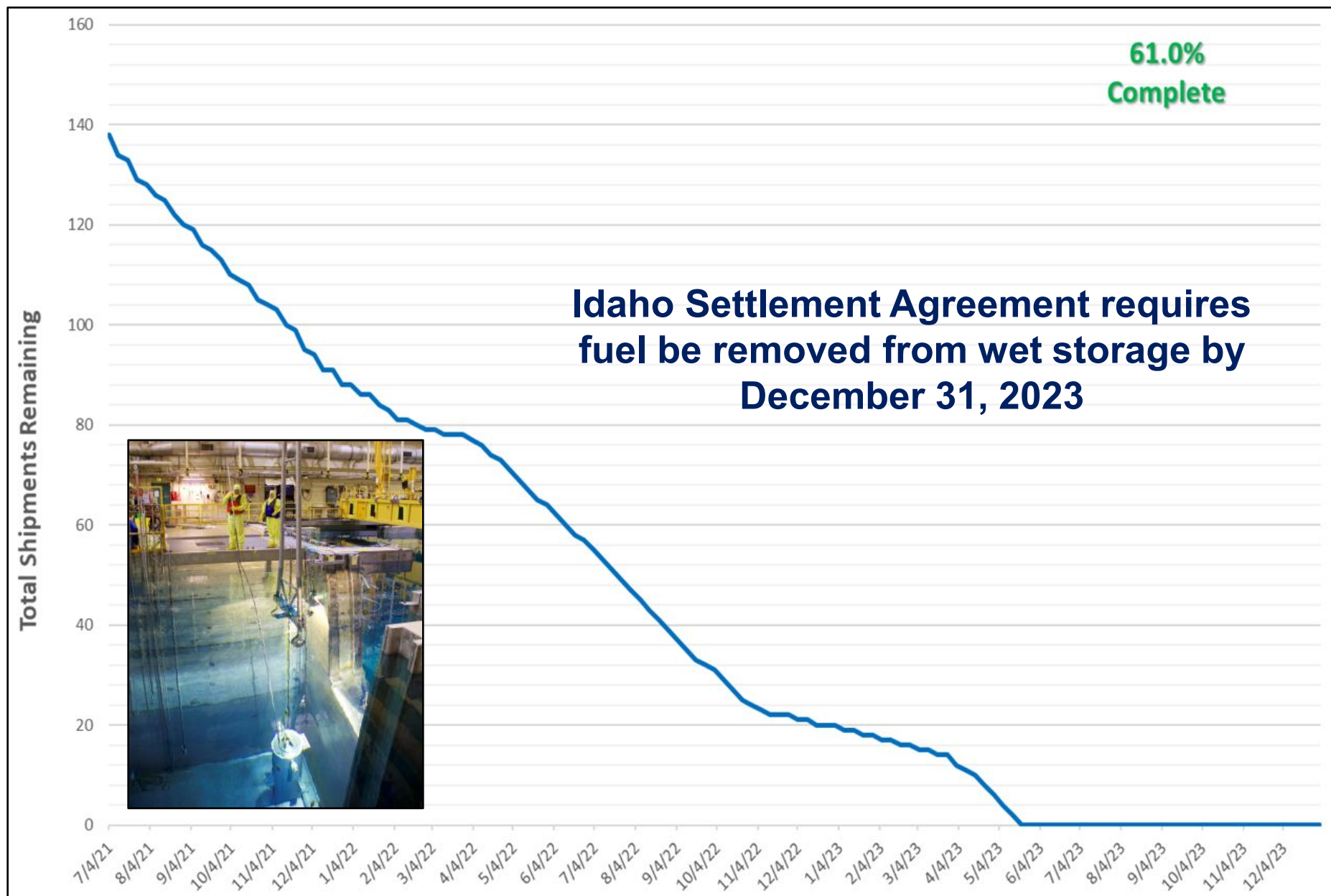


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# Wet to Dry Shipments Remaining



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# Navy Fuel

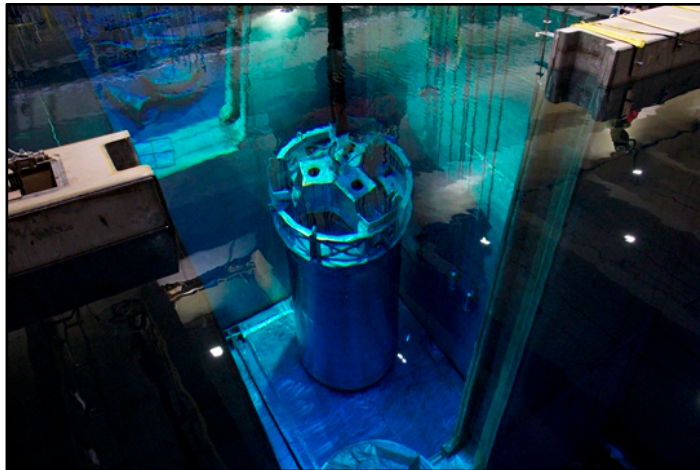
## Naval Reactor Fuel Transfers

- **Scope**

- Complete Naval fuel transfer from CPP-666 wet pool storage to the Naval Reactors Facility on INL Site (118 shipments)

- **Status**

- Complete. Last shipment (118 of 118) happened on January 29, 2019



Navy Large Cell Cask in the CPP-666 Basin



SNF crew removing the fuel-loaded Large Cell Cask from the CPP-666 Basin





# Spent Nuclear Fuel Staging Facility

- Facility design to start in FY22
  - Use expandable design to allow construction in phases
  - Located near current CPP-2707 storage pads at INTEC
- Construction starting in FY23 to support output from the packaging demonstration project operation
- Expansions as needed to support packaging facility



CPP-2707 Storage Pads



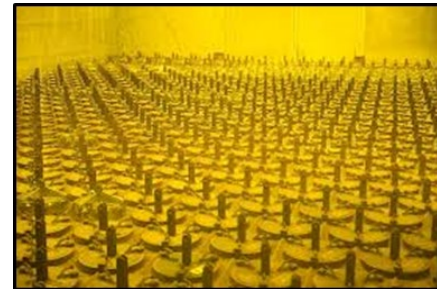
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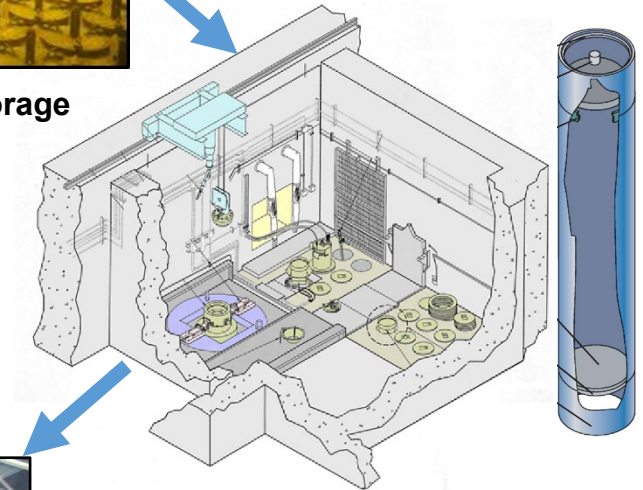
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# Packaging Demonstration Plan

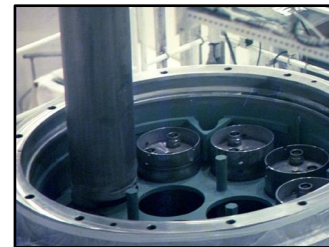
- Load DOE standardized canister with limited fuel types from the CPP-603 dry storage facility in the CPP-603 Fuel Handling Cave
- Move DOE standardized canisters to Staging Facility
- Initiate Transportation Certification License Amendment for contents of storage casks (10 CFR Part 71)



CPP-603 Dry Storage



CPP-603 Fuel Handling Cave & Standard Canister



Multi-canister Basket

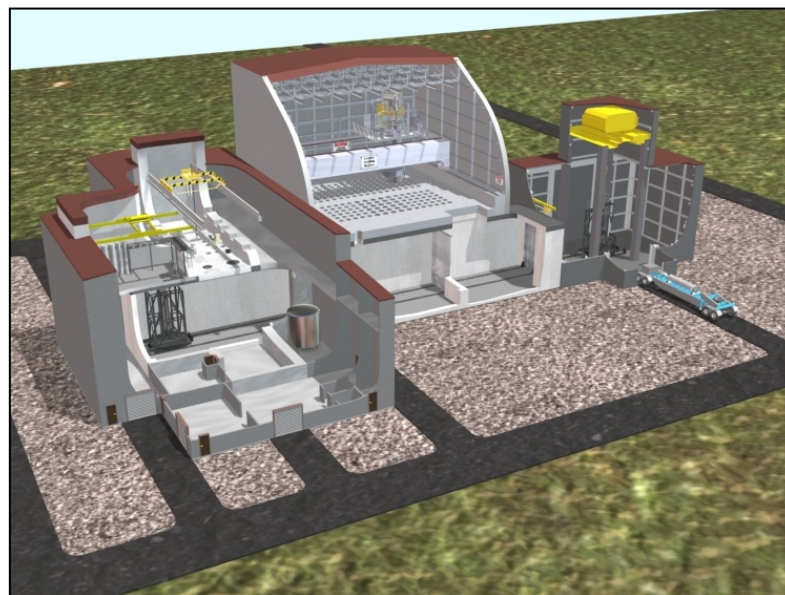


Staging Facility



# Packaging Facility

- Design will be guided by results and lessons learned from packaging demonstration and Navy packaging facility
- Will be able to package all spent fuel types
- Prepare packaged fuel for shipment



Artist rendition of a packaging facility



# Backup Pictures





# Fuel Types: Al-Clad, TRIGA and FSV

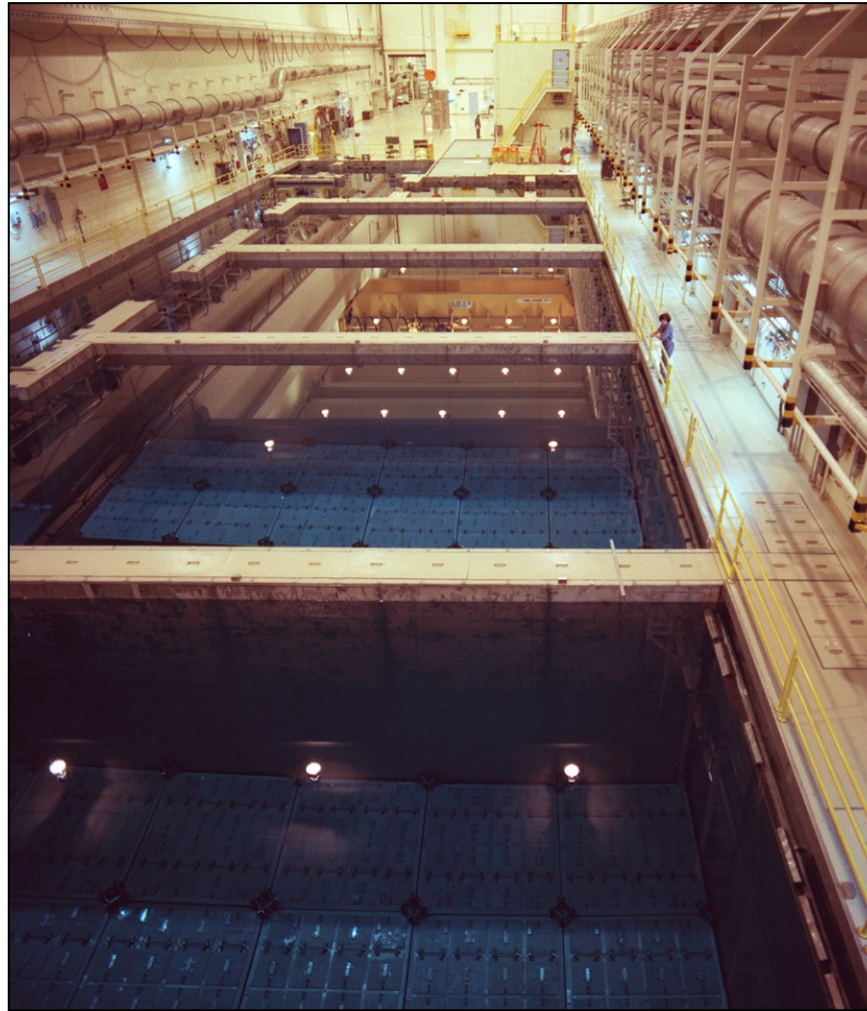


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# Indoor Wet SNF Storage at the INL



CPP-666, Fuel Storage Pools 1-6



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# Indoor Dry SNF Storage at the INL



CPP-603, Storage Array in the Irradiated Fuel Storage Facility



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# Outdoor Dry SNF Storage at the INL



CPP-749, Underground Vault Storage



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# Outdoor Dry SNF Storage at the INL



CPP-2707, Above Ground Pad for Cask Storage



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# Outdoor Dry SNF Storage at the INL



CPP-1774, Modular Dry Storage in NRC-Licensed ISFSI



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# Indoor Dry SNF Storage at Platteville, CO



Fort St. Vrain ISFSI, Indoor Vault, NRC-Licensed ISFSI



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