ICP SNF Management

NSNFP March 2010 Meeting

Idaho Cleanup Project

Information Requested

- *SNF Inventory – will be given verbally by facility*
- *Safety Basis – provided in facility description*
- *Quality Assurance – QARD compliant, annually audited by joint RW/EM Team*
- *Design-life and facility upgrades – provided in facility description*
- *Aging Management – provided as separate slide*
- *Technology needs – provided as separate slide*
- *ID/SRS Exchange - provided*

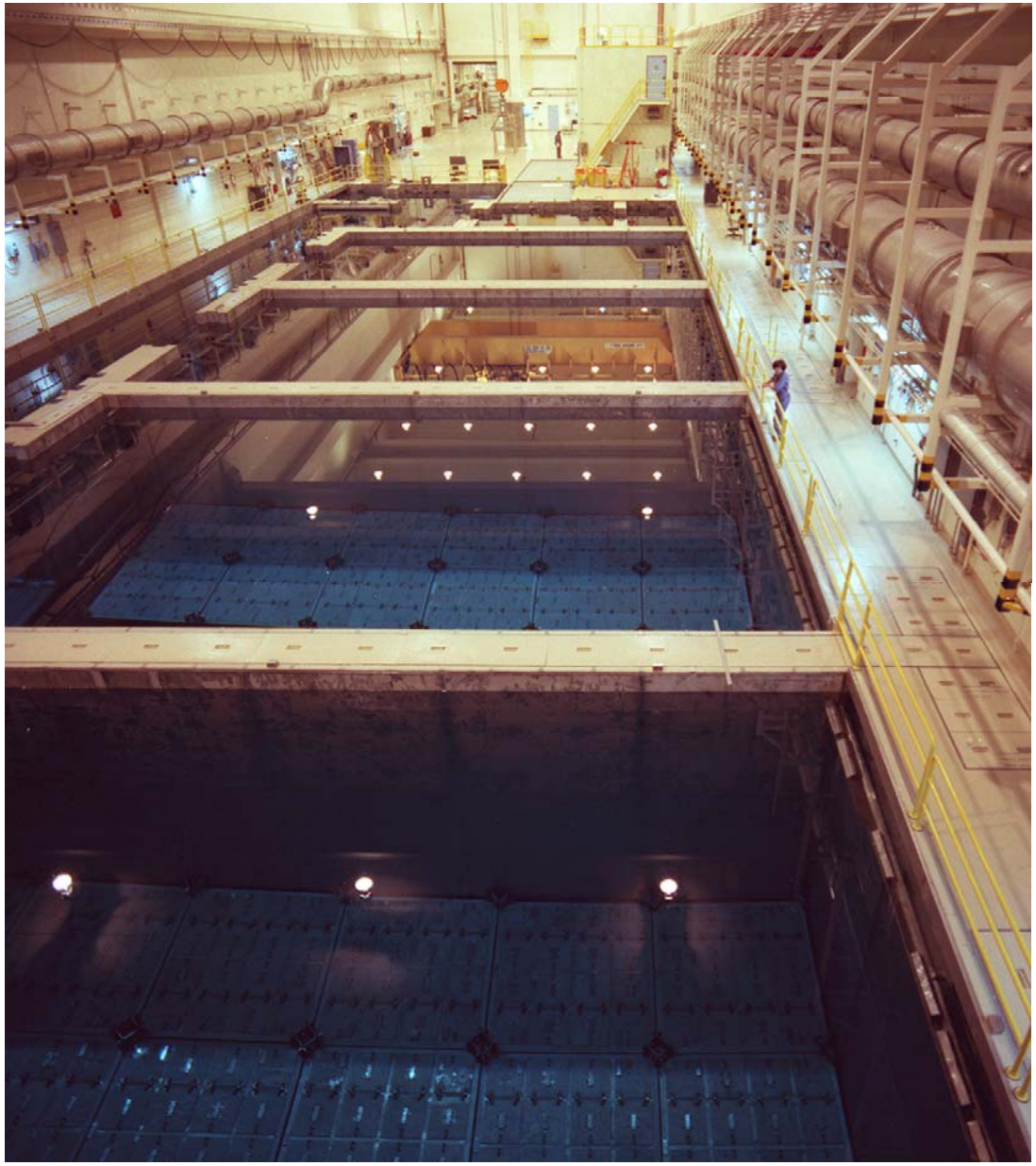
Spent Nuclear Fuel (SNF) Quantities and Types

- *EM Idaho Cleanup Project (ICP) has responsibility for approximately 262 MTHM of SNF:*
  - *63% in Idaho Nuclear Technology and Engineering Center (INTEC) DOE-regulated facilities*
  - *37% in Nuclear Regulatory Commission (NRC) licensed Independent Spent Fuel Storage Installations (ISFSI) at INTEC and Ft. St. Vrain, CO*
- *Domestic and Foreign Research Reactor (D/FRR) receipts will continue to increase the total ICP SNF inventory.*
  - *5 shipments in FY 2010*
  - *3 shipments in FY 2011-12*
  - *FRR clustered in 2017-19, anticipating program extension.*
- *Office of Nuclear Energy (NE) has requested that EM continue to receive Advanced Test Reactor (ATR) SNF.*
- *The ICP inventory includes a wide variety of fuel types with 220 "attributes". Attributes include size from 2 lbs to ½ ton; aluminum, stainless steel and zircaloy cladding; sodium-bonded, epoxy-bonded and carbon matrix fuels; intact, slightly damaged and totally crushed fuels; wide range of enrichment, and time in a reactor.*
- *SNF is currently managed through the CWI contract in 7 Configurations*

CPP-666 Fuel Storage Basin

- *Stainless steel-lined with leak detection system. Shares safety significant systems with adjacent RH-TRU packaging hot cell.*
- *Started operations in 1984; 40-year design life*
- *All ICP-assigned SNF will be retrieved and transferred to dry storage by June 30, 2010. (2888 of 3186 FHU transferred through March 1, 2010)*
- *NE-assigned ATR SNF will be received from the Reactor Technology Complex through 2012 (1,230 FHU total of which 440 FHU have been received).*
- *EBR-II SNF (3,624 FHU; not assigned to ICP).*
- *Naval Nuclear Propulsion Program SNF being returned to Naval Reactors Facility under MOA. NNPP pays all costs. Preparation and transfer of SNF to be completed by 2017. The path forward for two categories of cans holding fuel assembly cuttings and pieces is under development.*
- *Authorization basis assumes operation through 2035. Continuous routine S&M with upgrade to ventilation system suggested. Cutting pool should be grouted to eliminate leak.*

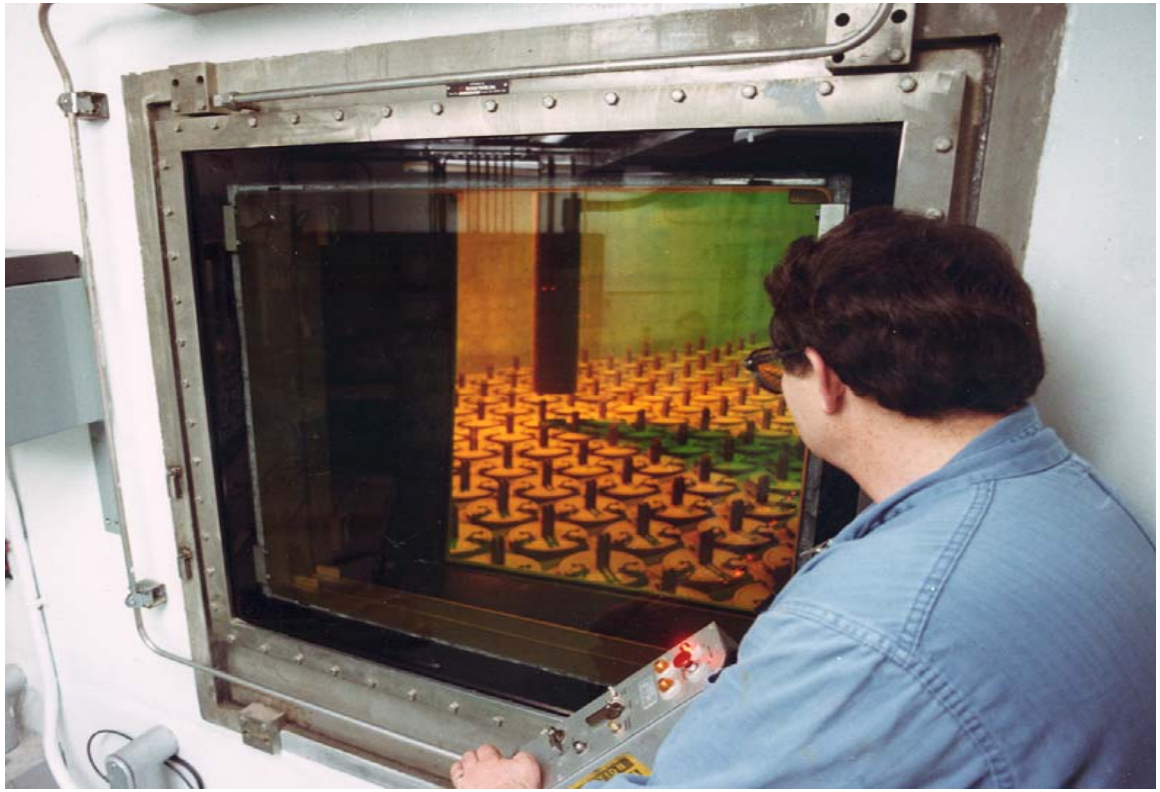
CPP-666 Fuel Storage



CPP-603 – Irradiated Fuel Storage Facility

- *Dry storage completed in 1974, designed to receive Fort St. Vrain SNF. Shares 1950s vintage structure with older closed and grouted fuel basin.*
- *Authorization basis assumes operation through 2035.*
- *SNF is remotely handled and stored in 18" diameter canisters (not sealed and not in an inert atmosphere) in contact with ambient air.*
- *Only intact SNF can be received; compromised SNF must be canned (these cans are not welded).*
- *5 shipments of DRR SNF will be received into this facility in Q4 FY10.*
- *Mechanical systems need to be upgraded to maintain min. safe storage, support retrieval of SNF for ID/SRS Exchange and to support FRR/DRR storage. ~$5M is required. Planned upgrades can be completed in FY 11, if funded.*
- *Roof is leaking and must be repaired. Suggested upgrades include staircase, changes in grading, and roof railing in addition to replacement of roof. Total estimated cost is ?*

CPP-603 Storage Array



CPP-749 – Underground Storage Vaults

- *3 types of vaults constructed between 1971 and 1985 each consisting of carbon steel pipes with shielding lids. 21 vaults are 12 ¾", 197 vaults are 30" in diameter.*
- *Authorization basis assumes operation through 2035. Routine S&M and corrosion monitoring is required.*
- *Some vaults are not usable because these vaults are located in an area where water from fire-water system leaks has collected in the past.*
- *One unirradiated Shippingport seed module (not SNF) is stored in a vault.*

CPP-2707 Cask Pad and Rail Car

- *Cask Pad was constructed in 2003 with a design life of 40 years (2043) but the authorization basis assumes operations through 2035.*
- *Pad has space for 20 cask storage positions; 6 are in use.*
- *SNF stored in the casks all came from Test Area North Spent Fuel Storage Cask Testing Program. fuel examination facility and includes the epoxied fuel.*
- *Rail car holds 2 rail casks from West Valley containing SNF of commercial origin. Fuel is not dried, not canned.*

Underground Vaults and Cask Pad

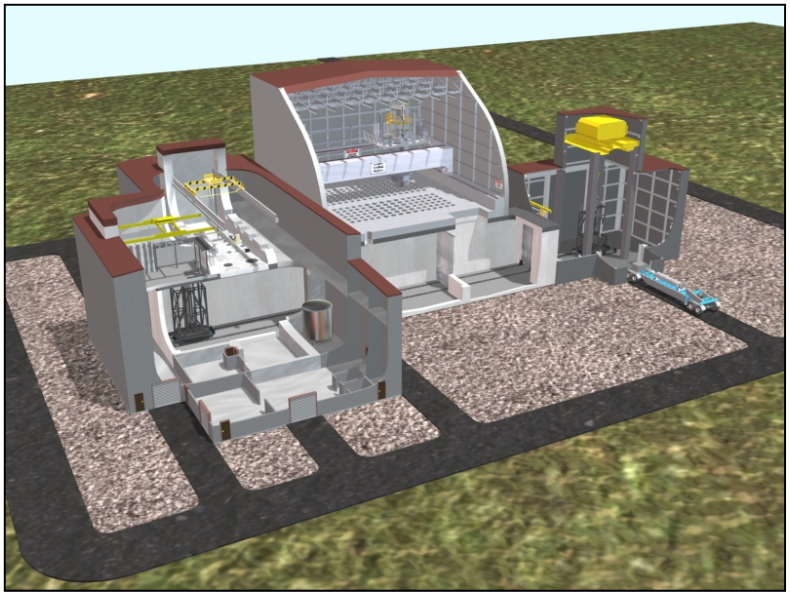
NRC Licensed Independent Spent Fuel Storage Installations (ISFSI)

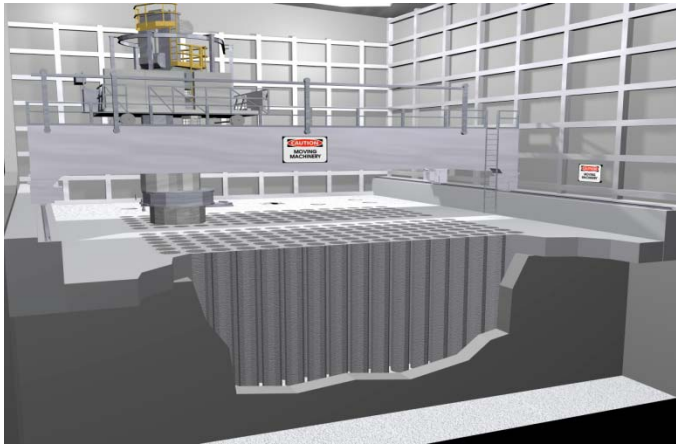
- *ICP holds the licenses for 3 NRC licensed ISFSI Fort Saint Vrain (FSV), Three Mile Island (TMI) and Idaho Spent Fuel Facility (ISFF, not constructed).*
- *Fort St. Vrain ISFSI is located in CO and was designed for carbon matrix SNF. A 20-yr license renewal package, including evaluation for life extension was submitted to NRC on 11/10/2009.*
- *S&M is defined by the NRC license.*

Three Mile Island ISFSI

- *The TMI ISFSI (NRC regulated) is located within the INTEC facility.*
- *TransNuclear NuHoms dry storage system.*
- *TMI is a set of 30 modular storage horizontal storage modules (29 filled).*
- *Loading began in 1999. NRC license must be renewed by 2019.*
- *S&M defined by license.*

ISFF Conceptual diagram





Regulatory Drivers

- ***1995 Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Record of Decision*** *– All activities in the current baseline were analyzed in the 1995 EIS.*
- *1995 Idaho Settlement Agreement –*
  - *All SNF in dry storage by 2023 – If not met, SNF receipts in Idaho stop.*
  - *All SNF out of Idaho by 1/1/2035 - $60K/day fine if not met.*
  - *DRR/FRR receipts are permitted, if the SNF is listed in SA amendment.*
  - *SRS/ID Exchange permitted if calendar year cask receipts equal casks sent from Idaho and total number received by Idaho does not exceed total sent.*
- *Colorado Agreement –*
  - *All SNF out of Colorado by 1/1/2035 - $15K/day fine if not met.*

Post-2012 SNF Storage

- *All ICP-assigned SNF has been consolidated at the INTEC facility area and in the Ft. St. Vrain ISFSI.*
  - *All ICP-assigned SNF will be in dry storage, as required by the 1995 Idaho Settlement Agreement, by September 30, 2010.*
  - *All INTEC, DOE-regulated dry storage facilities have an approved authorization basis that extends to January 1, 2035.*
  - *A 20-yr NRC-license renewal has been submitted for the Ft. St. Vrain ISFSI and a similar license renewal must be submitted for the TMI ISFSI in 2019.*
  - *All SNF must be removed from the state of Idaho by January 1, 2035 to comply with the Idaho Settlement Agreement.*
- *ICP has developed several management alternatives and has participated in development of management alternatives defined by other sites.*
- *Non-ICP assigned SNF is managed at INTEC, RTC and MFC facility areas.*

Aging Management

- *Recommending that post-2012 contract(s) SOW include a set of life-cycle extension studies for all DOE-regulated SNF storage facilities.*
- *Recommending that more attention be paid in post-2012 contract SOW to S&M necessary to maintain INTEC and Idaho Site infrastructure.*
- *Studies would be similar to the NRC license renewal required life-cycle extension studies.*
- *Have identified major upgrades needed for CPP-603.*

Future of SNF Storage

- *Maintain all storage facilities to assure compliance with documented safety basis (SARs)*
- *Comply with changes in nuclear material security requirements as SNF looses self-protective status.*
- *Achieve and maintain SNF retrieval capability through maintenance of canister/basket/bucket/cask integrity.*
- *Monitor fuel condition - package or repackage SNF if degradation is noted.*

Technology Needs

- *Technology to effectively dry SNF and to confirm dryness of SNF contained in a basket/container.*
- *Spent Nuclear Fuel Packaging – Poison Baskets, improved welding techniques.*
- *Technology to drill into cans and provide internal inspection in high radiation fields.*
- *Improved dry storage facility mechanical systems maintenance models/decision trees*
- *Enhanced retrieval, characterization and canistering flow models.*
- *Enhanced high-field radiological monitoring.*
- *Comfortable PPE.*
- *Reduced waste generation.*
- *D&D'able materials/structures.*
- *Continued improvements in radiation control.*
- *Continued improvements in crane design - manipulator dexterity, maintenance access.*
- *Continued improvements in transport tracking.*

ID/SRS SNF Exchange – Idaho Perspective

- *ICP has not received HQ written direction to proceed with Exchange. Funding is **not** available within target budget to proceed.*
- *Treatment of sodium-bearing liquid waste in 2012 is the highest priority for ICP.*
- *Crane up-grade is required to retrieve SNF from CPP-603 (~$5M and 6-months).*
- *Authorization basis is in place to receive NAC cask. GE-2000, BRR, etc. cask use will require authorization basis changes, new procedures and training – minimum of 6-month's lead time.*
- *6 Al-clad SNF types. 2 types are stored in NAC baskets. 1 type has a BRR basket design.*
- *Procedures to load-out SNF from CPP-603 have to be developed.*
- *Stay within the Settlement Agreement.*