Management of Spent Nuclear Fuel (SNF) and High Level Waste Form development at the Idaho National Laboratory

Information for the Nuclear Waste Technical Review Board Meeting
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Idaho National Laboratory SNF Wet to Dry Transfer
Transfer of SNF from wet to dry storage was initiated on 07/10/97.

All wet storage facilities other than CPP-666 were emptied as of 09/15/03.*

The remaining facility actively employed in wet storage is CPP-666.

Facilities (Wet and Dry Storage) Emptied of SNF

<table>
<thead>
<tr>
<th>Facility</th>
<th>Completed</th>
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<tbody>
<tr>
<td>TRA-660, ARMF/CFRMF</td>
<td>10/28/97</td>
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<tr>
<td>CPP-603, Basins</td>
<td>04/28/00</td>
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<tr>
<td>TAN-607, Basin Campaign I/TMI</td>
<td>04/18/01</td>
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<tr>
<td>TRA-603, MTR Canal and Plug Storage</td>
<td>09/24/02</td>
</tr>
<tr>
<td>TAN-607, Basin Campaign II/LOFT &amp; Comm</td>
<td>09/29/02</td>
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<tr>
<td>PBF-620, Pool</td>
<td>09/15/03</td>
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<tr>
<td>CPP-603/FECF</td>
<td>04/13/04</td>
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<tr>
<td>TAN-791, Dry Storage Pad</td>
<td>10/26/04</td>
</tr>
<tr>
<td>CPP-666, Basins Campaign I/EM SNF</td>
<td>06/06/10</td>
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* The ATR canal is not designated for storage, but functions rather in a fuel cooling capacity.
Removal of SNF from CPP-666 wet storage was initiated in December of 2004.

With the exception of three fuel types, all other fuel types were removed from CPP-666 as of 06/06/10.

The remaining SNF types are:

- Naval SNF
- EBR-II SNF
- ATR SNF
SNF Campaign Strategy - CPP-666 Fuel Storage Basin

Empty CPP-666

- Campaign 1
  - EM SNF
  - Complete

- Campaign 2
  - NR SNF
  - Underway

- Campaign 3
  - EBR-II SNF
  - Initiated

- Campaign 4
  - ATR SNF
  - In Planning
Campaign 3 – Experimental Breeder Reactor-II SNF
Experimental Breeder Reactor-II Driver SNF

- Materials and Fuels Complex (MFC) examines fuel and provides treatment.

- The first shipment of EBR-II SNF from Idaho Nuclear Engineering and Technology Center to MFC was completed in 2011.

- Six shipments are planned for FY2014.

- Completion is planned by 2023, with continued MFC treatment and possible interim dry storage.

Considerations:

- Suitability for treatment
- Shipping schedule
- Suitable receipt and storage capability
- Processing rates at MFC
- Funding
Fuel Cycle Research & Development focused on two baseline high level waste forms that could be produced from electrochemical processing.

- A zeolite-based ceramic waste stabilizes fission products that partition to the electrorefiner salt
- A stainless-steel-15% zirconium metal waste that stabilizes the activated cladding hulls and more noble fission products
Path Forward on Waste Form Approach from Electrochemical Processing

- Current Plans

- Future Plans
Campaign 4 – Advanced Test Reactor SNF
**Advanced Test Reactor (ATR) SNF**

- **ATR is part of the continuing INL mission, with plans to continue operations beyond 2023.**
  - ATR SNF, upon removal from the reactor core, must first be cooled in the ATR canal
  - ATR SNF currently transferred to CPP-666 for additional cooling pending future decision
  - Study underway to assess disposition options
Factors being considered.

- Reduced cooling requirements for dry storage
- Dry storage need and existing capabilities
- Funding profiles
- Potential continued need for wet cooling operations post-2023

Team in place and working to identify options and coordinate DOE decisions on most effective strategy to meet milestone.