NUCLEAR WASTE TECHNICAL REVIEW BOARD
FULL BOARD MEETING

SUBJECT: CURRENT AND EMERGING TRANSFER TECHNOLOGIES

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DALLAS, TEXAS NOVEMBER 2, 1993
Current & Emerging Transfer Technologies

Current Spent Fuel Transfer Experience

- 76 Pool Storage Sites
- 5 Dry Storage Sites
Current & Emerging Transfer Technologies

Current Spent Fuel Transfer Experience

Direct Pool Transfer Technology

- To transportation casks
- To metal storage casks
1. FUEL LOADING POOL
   - Load Spent Fuel Assemblies into Truck Transportation Cask.

2. FUEL LOADING POOL
   - Place Cask Shield Plug/Closure.
   - Move Cask to Prep/Decon Area.

3. PREP/DECON AREA
   - Install Cask Closure.
   - Decon Cask.
   - Drain, Dry, Inert Cask.

4. TRANSPORT PREP AREA
   - Place Cask on Transporter.
   - Install Tie Downs, Impact Limiters, Personnel Barrier.
   - Dispatch to MRS or MGDS.

DIRECT TRANSFER TO TRANSPORTATION CASK
# Current & Emerging Transfer Technologies

## Current SNF Dry Storage (ISFSI) Experience

<table>
<thead>
<tr>
<th>Location</th>
<th>Transfer Method</th>
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<tbody>
<tr>
<td>Surry</td>
<td>Direct In-Pool Transfer</td>
</tr>
<tr>
<td>H.B. Robinson</td>
<td>Horizontal Transfer Cask</td>
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<tr>
<td>Oconee</td>
<td>Horizontal Transfer Cask</td>
</tr>
<tr>
<td>Ft. St. Vrain</td>
<td>Vertical Transfer Cask</td>
</tr>
<tr>
<td>Palisades</td>
<td>Vertical Transfer Cask (HTGR Fuel)</td>
</tr>
<tr>
<td>Calvert Cliffs</td>
<td>Horizontal Transfer Cask</td>
</tr>
</tbody>
</table>
1. Move Transfer Cask to Prep Area.
2. Drain, dry, inert.
3. Weld structural closure.
4. Install transfer cask closure.
5. Decom transfer cask.
7. Load into storage cask.
8. Install cask closure.
9. Inert cask.

VERTICAL TRANSFER SYSTEM
BOLT 1-8 UNC 1.75 LG.
CASK LID

TRUNNION ASSEMBLY

CASK WALL ASSEMBLY

DOOR TO COVER

HYDRAULIC ASSEMBLY

RAIL ASSEMBLY

SNC TRANSFER CASK

SHIELD DOOR ASSEMBLY
LOAD (STEPS 1a - 5a SAME AS VERTICAL TRANSFER SYSTEM)

1. Loaded at Fuel Storage Pool
   - Move Loaded On-Site Transfer Cask to ISFSI.

2. HORIZONTAL STORAGE
   - Transfer MESC into Storage Unit.
   - Secure Storage Closure.

RETREIVE

3. HORIZONTAL STORAGE
   - Transfer MESC into On-Site Transfer Cask.
   - Move to Transfer Area.

4. TRANSFER AREA

5. - Install Cask Closure.
   - Insert Cask.
NUHOMS ON-SITE TRANSFER CASK
VAULT OPERATING HALL

ASSEMBLY HANDLING MACHINE

VAULT ACCESS PORT PLUG

CANISTER OUTLOAD

LIFT CANISTER INTO ASSEMBLY HANDLING MACHINE AND REPLACE VAULT ACCESS PLUG

VAULT OPERATING HALL

ASSEMBLY HANDLING MACHINE

PORTABLE DECK SLAB HOIST

DECK SLAB

STORAGE TUBE PLUG

MOVE PORTABLE DECK SLAB HOIST OVER SELECTED STORAGE TUBE AND REMOVE DECK SLAB

VAULT OPERATING HALL

ASSEMBLY HANDLING MACHINE

DECK SLAB

ALIGN HANDLING MACHINE OVER STORAGE TUBE AND ESTABLISH SEAL, REMOVE STORAGE TUBE PLUG AND EMBED CANISTER

VAULT OPERATING HALL

ASSEMBLY HANDLING MACHINE

STORAGE TUBE PLUG

REPLACE STORAGE TUBE PLUG & REMOVE ASSEMBLY HANDLING MACHINE

VAULT TRANSFER SYSTEM
Current & Emerging Transfer Technologies

Emerging Technologies

SNF Cask-to-Cask Transfer Systems

EPRI/DOE Cooperative Agreement

- Conceptual Design EPRI NP-7495
- Transnuclear

Newport News Transfer System

- Response to the MPC CBD Notice
- Navy Nuclear Experience
1 UTILITY FUEL POOL
- Load SNF into Transfer Device.
- Place Shield/Closure.
- Move Device to Prep Area.
- Install Closure.
- Drain & Dry Transfer Device.
- Move Device to Cask to Cask Prep Area.

2 THROUGH SHIELDED CELL
- Move SNF/On-Site Transfer Cask into Transfer Area.
- Locate SNF Transfer Device.
- Load SNF into Transfer Cask.
- Place Shield Plug.

3 - Move MPC to Prep Area.
- Weld MPC Shield Plug.
- Insert MPC.
- Weld MPC Structural Closure.

4 - Install Cask Closure.
- Insert Cask.

5 - Place Cask on Transporter.
- Install Tie Downs, Impact Limiters, and Personnel Barrier.
- Dispatch to MRS or MGDS.

EPRI/TN SHIELD CELL DESIGN
1 UTILITY FUEL POOL
- Load SNF into Transfer Device.
- Place Shield/Closure.
- Move Device to Prep Area.
- Load SNF into Dry Transfer Device.
- Close Shield Closure.
- Move to Cask to Cask Prep Area.

2 THROUGH ADAPTOR
- Move SNF/On-Site Transfer Cask into Transfer Area.
- Locate SNF Transfer Device on Adaptor.
- Load SNF into Transfer Cask
- Place Shield Plug.

3 - Move to Prep Area.
- Weld Shield Plug.
- Inert.
- Weld Structural Closure.

4 - Install Cask Closure.
- Insert Cask.

5 - Place Cask on Transporter.
- Install Tie Downs, Impact Limiters, and Personnel Barrier.
- Dispatch to MRS or MGDS.

NEWPORT NEWS TRANSFER SYSTEM
Figure 6

Newport News Shipbuilding
Summary

• MPC UTS system utilizes existing technology

• CDR UTS transfer systems
  – Direct transfer
  – Enhanced transfer
  – Cask-to-cask
  – UTS storage and transfer