Multi-Purpose Canister (MPC)

Jeff Williams, Director

Engineering Division
Office of Civilian Radioactive Waste Management
U.S. Department of Energy

Presentation to the Nuclear Waste Technical Review Board
Arlington, VA
June 14, 1995
MPC Status

- MPC certification
  - Background
  - Program approach
  - MPC procurement—phased approach
  - NRC-DOE MPC certification and schedule
  - NRC staff support
  - Part 60 design considerations

- Westinghouse proposed design
  - MPC contractor workscope
  - Proposed design
MPC System

- Multi-Purpose Canister (MPC)
- Impact Limiter
- Transportation Cask
- Storage Unit
- Other Possible Overpacks
  - MPC + SNF = Waste Form
  - MPC
  - Disposal Container
  - Waste Package

Office of Civilian Radioactive Waste Management
MPC—A Key Aspect of the Waste Acceptance, Storage, and Transportation Project*

• Ensure multi-purpose canisters are available in 1998 for at-reactor storage, waste acceptance, transport, and ultimately disposal

• Contract awarded for design of multi-purpose canister subsystem and preparation of Safety Analysis Reports (Phase 1)—April 21, 1995

*Program Plan, Volume III—December 1994
MPC Procurement Phases

- Phase 1—SAR design
- Phase 2—Certification and prototypes
- Phase 3—Fabrication
MPC Certification

- Meet requirements of 10 CFR Part 71 (Packaging and Transport of Radioactive Material) and 10 CFR Part 72 (Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste)

- Vendor expertise in Parts 71 and 72

- Be compatible with requirements of 10 CFR Part 60 (Disposal of High-Level Radioactive Waste in Geologic Repositories)
NRC-DOE MPC Certification Schedule

<table>
<thead>
<tr>
<th>ID</th>
<th>TASK NAME</th>
<th>1996</th>
<th>1997</th>
<th>1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre-acceptance Review 1/96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Review Cycles 4/96-12/97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>NRC Round 1 Review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>DOE Responds to R1 Questions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>NRC Round 2 Review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>DOE Responds to R2 Questions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>NRC Final Review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>NRC Issues Part 71, 72 SER's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Fabrication Exemption (If Requested)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>NRC Rulemaking 8/97 - 10/98</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NRC Staff Support

• Established Spent Fuel Program Office
  ▪ Integrated review of proposed MPC design by Part 71 and Part 72 staff

• Established Burnup Credit Task Force
  ▪ Integrated review of Burnup Credit and other issues by Part 60, Part 71, and Part 72 staff
NRC Staff Support

- Provided guidance on scope and content for addressing MPC Part 60 design considerations in the repository pre-licensing period
  - Interaction with waste package
  - Interaction with natural and engineered systems
  - Interaction with repository operations
MPC Specification—Repository Requirements

- Material requirements
  - Shell and closure lids—low carbon stainless steel
  - Shield plug—no lead
  - Basket—low carbon stainless steel or high nickel alloy

- Thermal requirements
  - Maintain clad temperature of 350° with total heat load of 14.2 KW and surface temperature of 225°
MPC Specification—Repository Requirements

- Long-term criticality control requirements
  - Maintain subcriticality with collapsed flux traps
  - Credit for only 80% of as-manufactured $^{10}$B

- Filler material requirements
  - Capability to remove and reseal lids