Guidance Development for a Storage-Transportation-Storage Interface

Darrell Dunn
U.S. NRC
Office of Nuclear Material Safety and Safeguards
Division of Spent Fuel Management
Background

- NRC has received 2 license applications for Consolidated Interim Storage Facilities (CISFs)
- CISF applications include spent fuel currently in storage canisters at existing independent spent fuel storage installations (ISFSIs) licensed under 10 CFR Part 72
- These canisters are proposed to be transported under 10 CFR Part 71, and subsequently placed into storage at the CISF under Part 72 (72-71-72)
Consolidated Interim Storage Facilities

WCS, Andrews County Texas

Holtec Intl. HI-STORE, Eddy-Lea Counties, NM
NRC Review Guidance

• Additional guidance necessary for the review of a 72-71-72 interface in Part 72 applications
  – Consider the activities involved during initial storage, transportation and subsequent storage
  – Applicable regulatory requirements
  – Important system variations
  – Testing and nondestructive examination (NDE) to demonstrate an adequate margin of safety
  – Allowable credit for examinations or tests
    • Such as examinations required by an aging management program (AMP)
Testing and Nondestructive Evaluation Methods

• Canister helium leak rate test
  – Conducted inside the transportation package
  – Verify no canister breaches prior to and/or after transportation

• Visual Examination
  – Performed using remote methods while canister is in a storage or during transfer operations
  – Detection of aging effects and handling defects

• Surface/Volumetric NDE
  – Performed using remote methods while canister is in storage or during transfer operations
  – Eddy current and ultrasonic testing are potential methods
  – Characterize aging and handling effects
Testing and Nondestructive Evaluation Methods

• Leakage Testing ANSI N14.5 Radioactive Materials - Leakage Tests on Packages for Shipment

• Visual Examination
  – Fiber optic system
  – Inspection robot/crawler

• Surface/Volumetric examination
  – Inspection robot/crawler
  – Inspection ring systems
Scenario Variations

- Dual purpose storage and transportation canister based systems in CISF applications
- Systems designed only for storage
- Part 72
  - Initial license/Certificate of Compliance (CoC) period
  - Period of Extended Operation (PEO) with AMPs
- Part 71
  - No credit for canister boundary integrity
  - Credit for canister boundary integrity
### Example #1

**Initial CoC/License with no credit for canister boundary integrity for Part 71**

<table>
<thead>
<tr>
<th>Part 72</th>
<th>Part 71</th>
<th>Part 72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Storage</td>
<td>Pre-transport</td>
<td>CISF Receipt</td>
</tr>
<tr>
<td><strong>In accordance with the ISFSI...</strong></td>
<td><strong>No canister leak test unless CISF...</strong></td>
<td><strong>100% canister leak test</strong></td>
</tr>
<tr>
<td></td>
<td><strong>No visual examination unless...</strong></td>
<td><strong>Visual examination - minimum...</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>No surface/volumetric NDE unless...</strong></td>
</tr>
<tr>
<td><em>In accordance with the initial CISF License, Technical Specifications, and License/CoC Conditions</em></td>
<td><em>No canister leak test unless CISF receipt testing results do not meet acceptance criteria</em></td>
<td><em>In accordance with the initial CISF License, Technical Specifications, and License Conditions</em></td>
</tr>
<tr>
<td></td>
<td><em>No visual examination unless initial CISF receipt visual examination results do not meet acceptance criteria</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>No surface/volumetric NDE unless visual examination results do not meet acceptance criteria</em></td>
<td></td>
</tr>
</tbody>
</table>

January 23, 2018  
2018 INMM
Example #2
Initial CoC/License with credit for canister boundary integrity for Part 71

<table>
<thead>
<tr>
<th>Part 72</th>
<th>Part 71</th>
<th>Part 72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Storage</td>
<td>Pre-transport</td>
<td>CISF Receipt</td>
</tr>
<tr>
<td>In accordance with the ISFSI License or CoC, Technical Specifications and License/CoC Conditions</td>
<td>100% Canister leak test</td>
<td>100% Canister leak test</td>
</tr>
<tr>
<td></td>
<td>Visual examination - minimum of 2 from each originating site (most susceptible).</td>
<td>No visual examination</td>
</tr>
<tr>
<td></td>
<td>No surface/volumetric NDE unless visual examination results do not meet acceptance criteria</td>
<td>No surface/volumetric NDE</td>
</tr>
</tbody>
</table>

January 23, 2018
## Example #3
**PEO with no credit for canister boundary integrity for Part 71**

<table>
<thead>
<tr>
<th>Part 72</th>
<th>Part 71</th>
<th>Part 72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Storage</td>
<td>Pre-transport</td>
<td>CISF Receipt</td>
</tr>
<tr>
<td>In accordance with renewed ISFSI License or CoC, Technical Specifications, License/CoC Conditions and AMP(s)</td>
<td>No canister leak test unless CISF receipt testing results do not meet acceptance criteria</td>
<td>100% Canister leak test</td>
</tr>
<tr>
<td>No visual examination unless initial CISF receipt visual examination results do not meet acceptance criteria</td>
<td>Visual examination - minimum of 2 from each originating site (most susceptible). Credit for AMP examinations permitted</td>
<td></td>
</tr>
<tr>
<td>No surface/volumetric NDE unless visual examination results do not meet acceptance criteria</td>
<td>No surface/volumetric NDE unless visual examination results do not meet acceptance criteria</td>
<td></td>
</tr>
</tbody>
</table>
## Example #4
**PEO with credit for canister boundary integrity for Part 71**

<table>
<thead>
<tr>
<th>Part 72</th>
<th>Part 71</th>
<th>Part 72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Storage</td>
<td>Pre-transport</td>
<td>CISF Receipt</td>
</tr>
<tr>
<td>In accordance with renewed ISFSI License or CoC, Technical Specifications, License/CoC Conditions and AMP(s)</td>
<td>100% Canister leak test</td>
<td>100% Canister leak test</td>
</tr>
<tr>
<td></td>
<td>Visual examination - minimum of 2 from each originating site (most susceptible). Credit for AMP examinations permitted.</td>
<td>No visual examination</td>
</tr>
<tr>
<td></td>
<td>No surface/volumetric NDE unless visual examination results do not meet acceptance criteria</td>
<td>No surface/volumetric NDE</td>
</tr>
<tr>
<td></td>
<td>In accordance with the initial CISF License, Technical Specifications, License Conditions and AMP(s) for SSCs in the PEO</td>
<td></td>
</tr>
</tbody>
</table>
Contingency Planning

• The number of canisters that are found to have indications of aging are anticipated to be limited

• An acceptable plan for addressing canisters with aging effects is expected to be provided in the CISF application
  – Procedures and controls to limit occupational exposures and site boundary dose limits
  – Corrective actions necessary to return to normal operations
  – Necessary to meet the requirements of 10 CFR 72.24(c)(3), 72.24(d), 72.24(e), 72.104 and 72.106
Path Forward

• Collect input from industry and the public at meetings and conferences – Summer 2018

• Incorporate draft guidance into the Storage Standard Review Plan (SRP) – Fall 2018

• Issue revised SRP for public comment – Spring 2019

• Address public comments and issue revised guidance – Summer 2019
Acronyms

- AMP: Aging Management Program
- CISF: Consolidated Interim Storage Facilities
- CoC: Certificate of Compliance
- ISFSI: Independent Spent Fuel Storage Installation
- NDE: Nondestructive examination
- SSC: Structure, System or Component
- PEO: Period of Extended Operation
- SRP: Standard Review Plan