



Spent Fuel Transportation Regulatory Issues

Meraj Rahimi
Chief of
Criticality, Shielding and Dose Assessment Branch
Spent Fuel Storage and Transportation Division
Nuclear Material Safety and Safeguards Office

Regulatory Issues with Technical Nature

- **Current Generic Transportation Issues**
 - High Burnup Fuels
 - Additional Burnup Credit
- **Additional Issues for Certifying Storage Systems for Transportation**
 - Effect of fuel gaps
 - Aging Management
 - Acceptance and maintenance tests

High Burnup Spent Fuels

- Spent fuels > 45 GWd/MTU:
 - Unknown mechanical properties of cladding
 - Resulting in possible loss of fuel geometry under transportation conditions
- Possible paths for addressing
 - Obtaining data on high burnup claddings
 - Canning
 - Moderator Exclusion
 - Reconfiguration

Additional Burnup Credit

- **Some key sub-issues**
 - Insufficient fission product isotopic data for depletion and criticality benchmarking
 - Misoad events
- **Prop. revision to Interim Staff Guidance 8**
 - Provides guidance on actinide and fission product benchmarking
 - Provides an alternative to burnup verification measurement

Effects of Fuel Gaps

- Gaps between fuel and canister/cask cavity
 - Result in significant amplification of g loads experienced by fuels and closure lids under hypothetical accident conditions for transport
- Possible paths for addressing
 - Spacers
 - Redesign of external impact limiters
 - Demonstrating safety with loss of fuel geometry

Aging Management

- Insufficient knowledge about the safety-related already-loaded storage system at the time of transportation certification request
- Possible paths for addressing
 - An aging management plan at the time of submittal of transportation application

Acceptance and Maintenance Tests

- Inadequate consideration of transportability of storage systems
- Inadequate acceptance tests and maintenance tests normally required under 10 CFR 71.85 and 71.87
- Possible paths for addressing
 - Best estimate calculations compared to measurements (e.g., thermal and dose) prior to transport combined with data from Aging Management

Summary

- Some current spent fuel regulatory issues with technical nature include High Burnup and Additional Burnup Credit
- Additional issues with certifying already-loaded storage system for transport include fuel gaps, aging management, acceptance, and maintenance tests
- Issues become more challenging at the decommissioned sites