



Idaho National Laboratory

NRC Review of Transportation Strategy for DOE Fuel

NSNFP Strategy Meeting

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Background

- **Significant discussion on the licensing approach for transportation of DOE SNF**
- **Industry peer-review of existing analyses and documentation**
- **Understand industry practices**
- **Presented our approach to DOE-EM and DOE-RW in October-November 2005**
- **Prepared for NRC Spent Fuel Project Office meeting as early as February 2006**
- **Met with NRC Spent Fuel Project Office on June 1, 2006**

June 1 NRC Meeting Agenda

- 9:00 a.m. Introductions
- 9:10 a.m. Meeting Objectives and NSNFP Role
- 9:20 a.m. DOE-EM SNF Packaging and Transportation
- 9:40 a.m. DOE-EM Standardized Canister Design and
- Test Program
- 10:15 a.m. Criticality Approach
- 10:45 a.m. Topical Report Contents
- 11:00 a.m. Summary & NRC Feedback
- 11:15 a.m. Public Comments
- 11:30 a.m. Adjourn

Purpose of NRC Meeting

- **Provide background on Office of Environmental Management's (DOE-EM) National Spent Nuclear Fuel Program (NSNFP)**
- **Discuss the role of the Standardized Canister during transportation of DOE-EM managed spent nuclear fuel (SNF)**
- **Provide an overview of the Standardized Canister design and testing**
- **Discuss moderator exclusion under 10 CFR 71.55 and ISG-19**
- **Discuss plans for topical report preparation and submittal**

DOE-EM SNF Packaging Approach

- **Presented differences between the DOE-EM Standardized Canister and the DOE-RW Transportation, Aging and Disposal Canister**
- **Limited the DOE Standardized Canister discussion to Transportation (10CFR71)**
- **Related the DOE Standardized Canister to the Idaho Dry Storage Project canister the Spent Fuel Project Office had already reviewed**

DOE Standardized Canister

- Presented the design codes, analyses, and testing performed on 18-inch DOE Standardized Canisters
- Presented our basis for robustness of DOE Standardized Canister
- Presented preliminary criticality analysis performed on 18-inch DOE Standardized Canister loaded with Aluminum plate fuels (four types)
- Presented basis for selecting ATR fuel loaded in 18" X 15' as the bounding case
- Requesting consideration of ISG-19 for moderator exclusion during transportation, beyond hypothetical accidents
- Absent moderator intrusion, the canister remains subcritical under all hypothetical accident conditions, including no credit for Standardized Canister internals, flooding of the cask, etc.

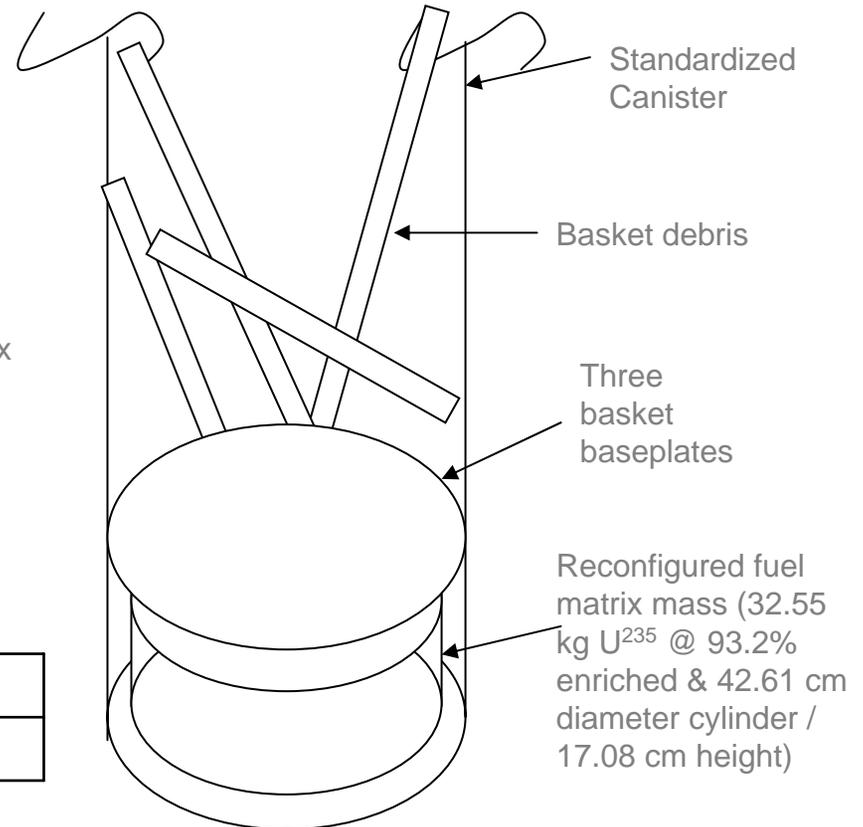
Why Moderator Exclusion

- **10CFR71.55(b) requires package to remain subcritical under normal transportation loads while flooded**
- **10CFR71.55(e) requires package to remain subcritical under hypothetical accidents while flooded**
 - **To meet these conditions, characterization and structural integrity of the fuel needs to be known**
 - **Performance of the canister internals needs to be known**
- **ISG-19 allows an approach to cover high-burnup, damaged commercial fuel**

Fuel Rubblization Forming a Cylinder

- 30 ATR fuel assemblies rubblized
- Standardized Canister is fully water reflected
- 11 vol% water saturation of fuel matrix

Configuration	$k_{\text{eff}} + 2\sigma$
cylinder w/ 11% H ₂ O	0.6235 + 2*0.0007



(This configuration analyzed in subsequent 4-pack inside a transport cask)

Comments from NRC-SFPO

- **Will dynamic materials testing be performed at -20F**
- **SFPO expressed interest in seeing the dynamic test apparatus and data**
- **How will dryness of the canister at time of loading be demonstrated, and will it be included in the Topical Report**
- **Biggest hurdle will be obtaining allowance for moderator exclusion for 10CFR71.55(e), NRC has never granted that for transportation**

Comments from NRC-SFPO cont'd

- **Going for exception 10CFR71.55(c) is based on a specific case request, not hundreds of shipments**
- **There are considerations beyond 10CFR71 that need to be considered**
- **Approve of this request will require Commissioner involvement because it is beyond how NRC policy is usually applied**
- **Need to succinctly identify what is being requested and what we are asking the NRC to do**

Path Forward

- **Contact NRC to clarify some of the questions, and discuss format for the Topical Report**
- **Formally articulate our request to the NRC SFPO and request a safeguards meeting**
- **Formally respond to questions, and invite NRC SFPO to INL to observe dynamic material testing**
- **Discussions with cask vendor(s) over interface with cask CofC documents**
- **NSNFP proceeding with Topical Report**

Schedule

- **Letters drafted for sending to the NRC**
 - **Articulating what the topical report will address, what is expected from NRC review, and requesting a separate meeting on security related issues**
 - **Documenting questions raised at the June 1 meeting, with responses and inviting the SFPO to visit the INL dynamic testing laboratory**
- **Complete a draft topical report by October 1, 2006**
- **Submit topical report to SFPO in early CY 2007**
- **NRC concurrence with topical report by end of 2008**