



U.S. Nuclear Waste Technical Review Board

NWTRB
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Breakout Sessions – Where are we going... and how do we get there?

Presented to:

**Technical Workshop on the Impacts of Dry-Storage
Canister Designs**

Presented By:

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November 19, 2013

Objectives

- Identify issues – not resolve them
- Focus is technical issues – but everything will be recorded
- SNF management stages from cask/canister loading on:
 - Storage (e.g. on-site ISFSI)
 - Transportation
 - Repackaging (e.g. CSF)
 - Further storage (e.g. CSF)
 - Further transportation
 - Overpacking for disposal
 - Emplacement
 - Post-closure
- Examine interactions between stages/operations to help identify issues



Logistics

- Two sessions – two rooms, free movement but...
- Open discussion – question cards available, but not required
- Three hours – until the lunch break
- Facilitators – to guide/encourage/cajole/control/keep on target/keep on schedule
- Flow paths and interaction matrices – to help identify issues
- Rapporteurs – to catch the issues for this afternoon and for the report
- Transcribers – to let us rewind



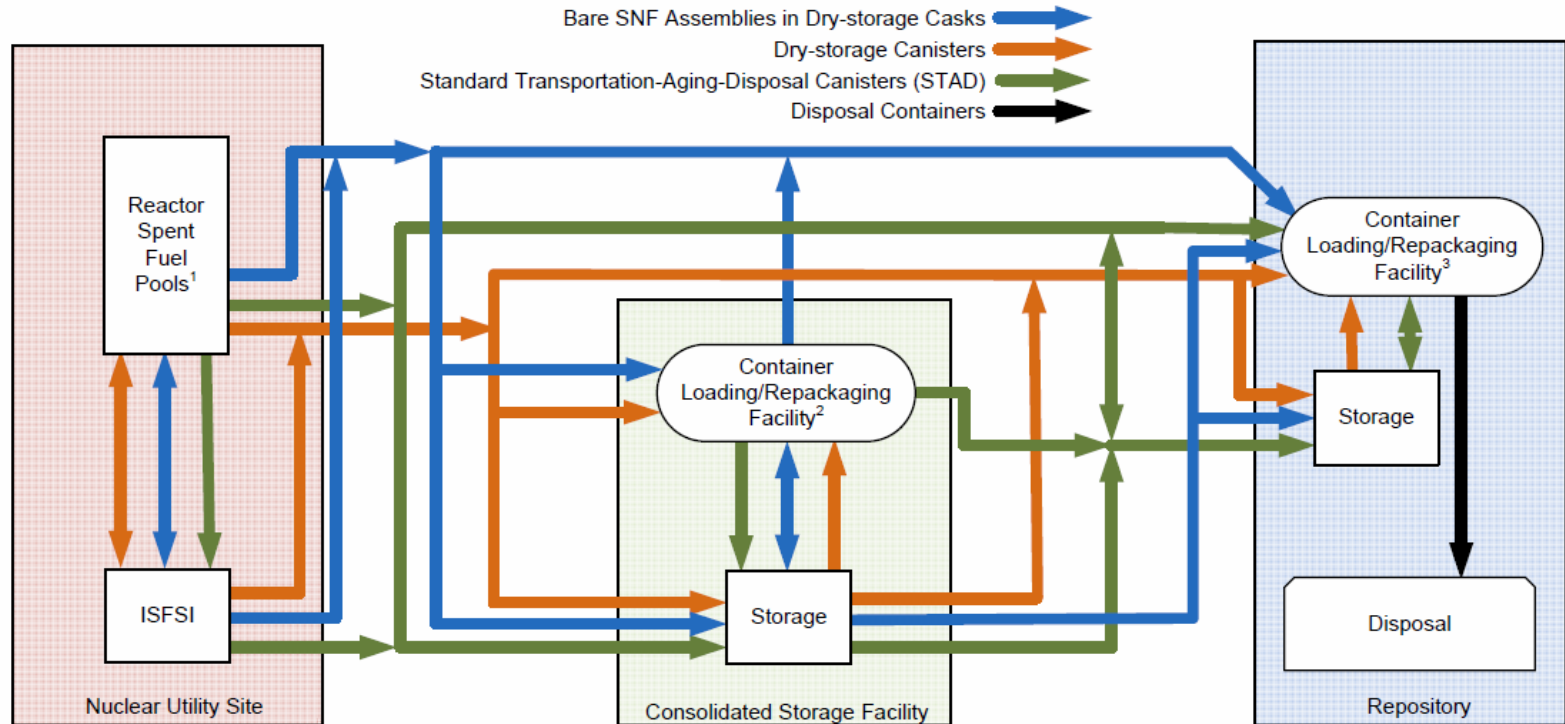
Flowcharts

- Session 1 – Includes repackaging SNF
 - Why, where, when and by whom – all variables
 - Many flowpaths – there may be many more than shown
 - After repackaging – sizes down, numbers up
- Session 2 – Direct disposal of large canisters
 - No repackaging from canisters – but some bare fuel
 - Less flowpaths than session 1 – there may also be more than shown
 - Hot and heavy – all the way



Flowchart for Repackaging

Session 1 Potential Material Flow Paths Implications of Repackaging SNF for Transportation or Disposal



General Notes:

- All arrows outside the shaded facility boxes represent transportation operations.
- There are some dry-storage casks at utility sites that contain bare SNF assemblies which can be loaded into STADs at the utility site, Consolidated Storage Facility, or Repository; or loaded into disposal containers at the repository.

Footnotes:

1. Utility fuel pools can be used to transfer SNF assemblies from a dry-storage canister or dry-storage cask to STADs or dry-storage cask into a STAD or disposal container, if the disposal container is transportable.
2. The Container Loading/Repackaging Facility at the Consolidated Storage Facility can be used to transfer bare SNF assemblies or SNF assemblies in a dry-storage canister to STADs.
3. The Canister Loading/Repackaging Facility at the Repository can be used to transfer bare SNF assemblies or SNF assemblies in a dry-storage cask or dry-storage canister into a STAD or disposal container, or load a STAD into a disposal container.



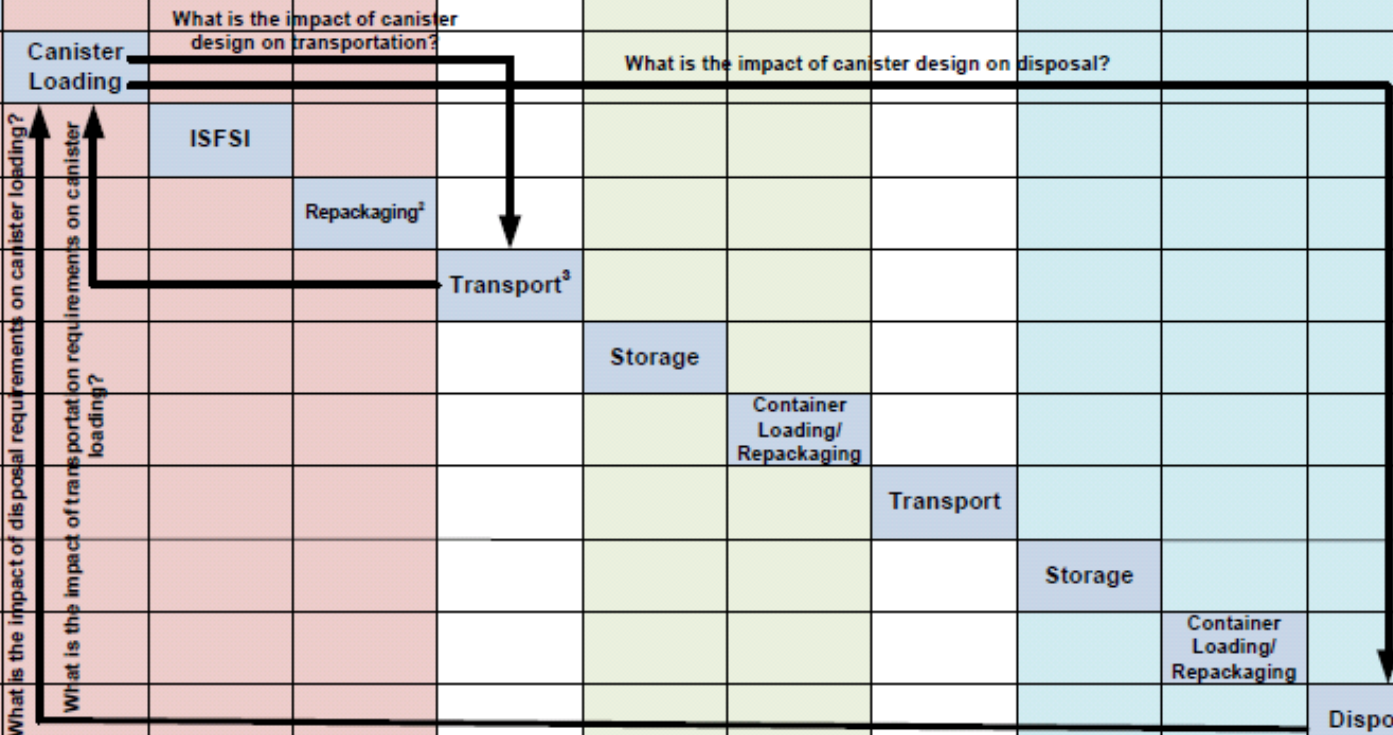
Interaction Matrices

- Cover all bases
- Along the diagonal – follows the flowpaths
- Above the diagonal – impact on later stages
- Below the diagonal – impact on earlier stages
- Go with the flow – no stovepiping



Finding the Issues...

	Nuclear Utility Site ¹				E	Consolidated Storage		H	Repository		
	A	B	C	D		F	G		I	J	K
1	SNF in Fuel Pool										
2		Canister Loading									
3			ISFSI								
4				Repackaging ²							
5					Transport ³						
6						Storage					
7							Container Loading/ Repackaging				
8								Transport			
9									Storage		
10										Container Loading/ Repackaging	
11											Disposal



Footnotes:

1. Before the fuel handling and fuel pool facilities are decommissioned.
2. If the plant fuel pool has been decommissioned, repackaging would require a temporary fuel pool or dry transfer facility
3. If dry-storage canisters do not meet the transportation requirements the canisters may need to be repackaged prior to transporting



Asking Questions to Identify Issues

- ...
- A1 to B2 – How does SNF storage in the utility pool impact canister loading?
- A1 to C3 – How does SNF storage in the utility pool impact storage in an on-site ISFSI?
- ...
- A2 to E5 – How does canister design impact transportation from the utility site to a CIS?
- A2 to K11 – How does canister design impact disposal?
- ...
- E5 to B2 – How do transportation requirements impact canister loading?
- K11 to B2 – How do disposal requirements impact canister loading?
- ...



Recording the Issues

From cell	To cell	Potential Issue
A1	B2	...
	C3	...
...
B2	E5	<ul style="list-style-type: none"> • If credit for soluble boron is used in the criticality analysis, as the basis for canister loading at utility sites, the possibility exists that the canister may not meet the criticality requirements for transportation, as the analysis for transportation has to take account of the potential for the canister to become flooded with demineralized water. • Canister may meet structural requirements for storage but not for transportation
...
B2	K11	<ul style="list-style-type: none"> • The dry-storage canister criticality control material is aluminum impregnated with boron. The corrosion rate of this material may not be acceptable for repository disposal



Other Essentials

- DOE SNF – out of sight, not out of mind...
- Help the rapporteurs - not everything can be reduced to sound bites
- The workshop ends at 5:00 pm – but the door remains open:
 - Submit to November2013Workshop@nwtrb.gov
 - Breakout session records to be posted ~ 12/2/2013
 - Comments received by then taken into account
 - “Final” records to be posted by ~ 12/16/2013
- Transcript posted by ~ 12/16/2013
- Board report – first half of 2014

