

Issues Associated with Direct Disposal (DD)

Background Issues

- Rationale
 - Repackaging is complicated, expensive, risky
- Lack of back end plan impacts everything,
- Programmatic decision for DD will help to “harmonize” DOE/NRC/Utilities/Watchdogs and allow discussion to move forward.
- Decision for DD might limit siting options

Canister Design

- Might separate existing loaded and future canisters, and handle separately:
 - 1700 existing loaded canisters, many designs
 - Hot and heavy
 - Complex regulatory issues
 - Could optimize future canisters for DD (including storage, transportation, disposal?)
 - Who pays for any higher costs ?

Technical Issues

- Weight effects
- Thermal effects
- Criticality effects
- Environmental stability effects

Size and Weight

- Difficulties associated with transport, handling and emplacement of large canisters
- Engineering solutions possible?
- Future canisters might be designed differently, optimized for DD.
- Tradeoffs in size/number, risk
- Storage canisters are not certified for transportation, some discussion if they could be.

Thermal Effects

- Influences repository design: geologic formation type, drift spacing, canister spacing
- Informed decisions about pre-disposal storage/cooling, maybe up to 100+ years needed.
- High burnup fuel considerations
 - Longer storage/cooling?
 - Effects on transportation – transport before it cools below ductile/brittle transition temperature
- Future canister designs might be optimized

Criticality

- Need better analysis of existing canisters
 - Need info on details of fuel
- Future canister design might be altered to limit criticality
- Approach of criticality in performance assessment affects design

Environmental Stability in Repository

- Might assume that smart overpack design, specific to repository conditions (unknown at this point), will provide needed environmental resistance
- YM is example
- Alloy 22 now assumed to be suitable for oxidizing unsaturated environment, other solutions used elsewhere in world for other environments.

Other Issues

- Retrievability
 - Storage (canister or fuel assembly)
 - Disposal – heavy packages hard to retrieve
- Gouging/galling from handling heavy canisters
- Possibility of multiple repositories might allow flexibility to handle existing/future canisters or DOE SNF/HLW

