

# BRC Approach to the U.S. Institutional Framework for Spent Nuclear Fuel



Notre Dame Construction: 1163-1250  
Maintenance: 1250-present

*WM2011 Feb. 28 Panel*  
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Dry Cask



Storage Overpack



Transport Overpack



# Institutional Framework

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- Radioisotope Containment Standards:  
10,000 or 100,000 or 1,000,000 years?
- Voluntary Participation of U.S. States:  
“Do or do not.” There is no try.
- How many repository licenses to try for?
  - 1 = Monopoly (or 0 if 1 try fails)
  - 2 = Oligopoly? (or 1 if one try fails)
  - 3 = Market competition? (still 2 if 1 try fails)



# 1. Radioisotope Containment

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- Yucca Mountain: 1,000,000 years
- Sweden & Finland: 100,000 years
- U.S. Generic (other than Yucca Mountain): 10,000 years



# Exposure Pathways

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- **Groundwater:** Technetium-99 etc.
- **Air:** Carbon-14  
Larger global dose from a permeable ridge  
but considered to be below regulatory concern.  
(Atmospheric release unlikely for Scandinavian designs)
- **Neptunium-237:** Isotopically Pure Fissile Material Source  
(half life 2.14 million years)

Question not addressed: **Does locking up Np-237  
in storage casks for 10,000–100,000 years or more  
make hypothetical future generations more or less safe?**

# Repository Containment Standards:

## What will the BRC recommend?

- There was input to the BRC from a broad spectrum questioning a 1,000,000 year standard.
- A simple solution is to revert to a 10,000 federal standard, while cooperating states could require more.
- It is not clear what the BRC will recommend.

## 2. Voluntary Participation of U.S. States?

- The importance of building trust with states and local communities was a primary theme of input to the BRC.
- Voluntary participation of states will require a willingness to give them financial gains at **~tenths of total project costs**. (Experience suggests that a few % or less will not suffice.)
- To start with a voluntary siting process, and then balk at the benefits to states required for success, would be fatal to the goal of building trust.
- The BRC seems aware of these issues, but it is not obvious that there is a consensus to provide clear recommendations concerning the level of compensation needed to get states' cooperation with repository licensing.

### 3. Try to License How Many Repositories?

- Existing law says: **Two**
- Incentives sufficient for just one state to volunteer would be perilously close to insufficient for any to volunteer.
- So, for adequate probability of voluntary licensing success, incentives must be adequate for more than one state.
- Sweden and Finland started two licensing processes for each repository site licensed.
- To be confident of licensing two repository sites and try for a fully competitive market, the United States should probably try to license **three** repository sites.
- Following the (successful) Scandinavian model in this regard, the United States would then seriously engage six states to start with.

# ● Reactors & ★ Stranded Fuel Sites



Operating Reactors:

8 in West; 31 Midwest+Arkansas; 65 South+East



# How Many Repository Site Licensing Attempts Will the BRC Recommend?

- A consensus on this is not apparent in the BRC public record.
- It is not clear that the BRC reports will address this question at all.
- If the question is addressed, the recommended number of states to be seriously engaged may well be less than six.
- In any case, suggesting specific repository site locations is outside the purview of the BRC.



## What Will Be the Outcome of the BRC Process?

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- The BRC has a unique opportunity to help launch a viable institutional arrangement for spent fuel management, which could endure for centuries.
- The BRC understands and is earnestly engaged in the task.
- The greatest possible pitfall is lack of clarity on whether states' participation will be voluntary, and on the necessary incentives.
- Even given an optimal BRC report, timely and effective government action is far from certain.
- Success is possible. Much hangs in the balance.