

U.S. DEPARTMENT OF ENERGY  
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

**NUCLEAR WASTE TECHNICAL REVIEW BOARD  
FULL BOARD MEETING**

**SUBJECT: PRELIMINARY DOE REACTION TO  
NATIONAL ACADEMY OF SCIENCES  
REPORT**

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# Outline

- **Overview**
- **Preliminary DOE reaction**
- **Potential impacts**
- **Future activities**

# Overview

- **National Academy of Sciences (NAS) recommendations are far-reaching**
  - Depending on how they are implemented, may significantly impact the Yucca Mountain Project, and geologic disposal in general
- **NAS recommendations are, in some ways, inconsistent with the 1990 NAS "Rethinking" report**
  - That report de-emphasized model predictions
  - That report also recommended using models only for comparative purposes
- **Some NAS recommendations are consistent with DOE recommendations of April 1994; others are not**

# Preliminary DOE Reaction

**Several NAS recommendations and conclusions are consistent with current DOE thinking**

- **Health-based standard based on risk**
- **Focused on protecting people in the vicinity of Yucca Mountain**
- **Endorsement of negligible individual risk level**
- **Risk determined for average individual in a critical group**
- **Compliance based on the mean of predicted results**
- **Future technology and living habits based on current population characteristics**

# **Preliminary DOE Reaction**

(Continued)

## **Consistent recommendations (Continued)**

- **Active postclosure oversight cannot be relied upon to ensure repository performance**
- **Not possible to predict the probability/type of human intrusion over a period of 10,000 years**
- **Subsystem requirements unnecessary and possibly counterproductive**
- **The standard should not incorporate the principle of ALARA**

# **Preliminary DOE Reaction**

(Continued)

**DOE is particularly concerned with demonstration of compliance for periods beyond 10,000 years**

- DOE would still expect to perform these calculations to gain insight into system performance, in a qualitative sense**
- NAS recommendation based on the premise that the geologic system at Yucca Mountain is stable or can be quantified for a million years**
- However, significant uncertainties in such long-term predictions would make it difficult to provide reasonable assurance in a licensing arena**
- This is ultimately a policy matter that should take into consideration how other hazards are regulated**

# **Preliminary DOE Reaction**

(Continued)

**DOE is also concerned with the quantitative treatment of human intrusion impacts**

- **NAS recommends comparing these impacts with the limit for undisturbed repository performance**
- **In essence, this would make the human intrusion scenario the controlling scenario**
- **Human intrusion should be handled by qualitative requirements (e.g., design requirements and passive institutional controls)**

# **Preliminary DOE Reaction**

(Continued)

**Approach to calculation of risk to critical group appears to be too complicated**

- **Appendix C bases critical group on probabilistic evaluations of current population characteristics**
- **Proposed eight-step process involves computations that may not be easily understood**
- **Appendix D approach (based on subsistence farmer) may be more straightforward for use in a licensing arena**

# **Preliminary DOE Reaction**

(Continued)

## **Critical issues for subsequent EPA rulemaking**

- **Level of risk that is considered acceptable**
- **Time frame for quantitative compliance demonstrations**
- **Definition of a reference biosphere, including critical group and exposure scenarios**
- **Treatment of human intrusion**

# Potential Impacts to Project Activities

- **Increased emphasis on measures that would reduce long-term dose**
  - **Engineered barrier system design**
- **Increased emphasis on calculation of long-term dose**
  - **Waste form dissolution**
  - **Saturated zone hydrology and transport**

# Potential Impacts to Project Activities

(Continued)

- **Decreased emphasis on explicitly demonstrating compliance with NRC subsystem requirements**
  - **Defense-in-depth is still maintained through multiple barriers**
  - **Focus is on how individual subsystems contribute to total system performance**
- **Decreased emphasis on site characterization data that do not impact long-term doses**
  - **Pathways for and release of gaseous radionuclides**

# Future Activities

- **DOE will provide comments to EPA on the NAS report**
  - Requested in EPA's Federal Register Notice of September 11, 1995
  - Comments requested by October 26, 1995
- **DOE anticipates working with EPA and NRC during the rulemaking process**
  - The resulting standard has to be implementable in a licensing arena
  - DOE offers a unique perspective as the agency that will have to demonstrate compliance with the standard