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Do not include proprietary materials.*

DATE OF MEETING
11/02/1999

The attached document(s), which was/were handed out in this meeting, is/are to be placed in the public domain as soon as possible. The minutes of the meeting will be issued in the near future. Following are administrative details regarding this meeting:

Docket Number(s)	_____
Plant/Facility Name	<u>A possible high-level waste repository at Yucca Mountain</u>
TAC Number(s) (if available)	<u>A10214</u>
Reference Meeting Notice	<u>Facilitated Round Table Discussion of Defense in Depth</u>
Purpose of Meeting (copy from meeting notice)	<u>To foster a common understanding among the stake- holders on issues associated with repository defense in depth. The US NRC will discuss its current thinking on...</u>

NAME OF PERSON WHO ISSUED MEETING NOTICE

Christiana H. Lui

TITLE

Systems Performance Analyst

OFFICE

Nuclear Materials Safety and Safeguards

DIVISION

Division of Waste Management

BRANCH

High-Level Waste and Performance Assessment

Distribution of this form and attachments:

Docket File/Central File
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NH16


November 2, 1999

FINAL AGENDA

ROUND TABLE DISCUSSION ON DEFENSE IN DEPTH AS APPLIED TO A POSSIBLE HIGH-LEVEL WASTE REPOSITORY AT YUCCA MOUNTAIN, NEVADA


- 1:30 p.m. Welcome, Ground Rules, Agenda Overview and Participant Introduction
Francis "Chip" Cameron, Facilitator
- 1:50 p.m. Meeting Overview and Purpose
Keith McConnell, Section Chief
Performance Assessment and Integration Section
High-Level Waste and Performance Assessment Branch
1. Purpose of this meeting
 2. Statutory requirement on repository defense in depth
 3. Commission policy on defense in depth and the risk-informed and performance-based regulatory approach
 4. Clarifying Questions
 - Participant discussion
 - Audience comments
- 2:10 p.m. NRC's Current Thinking on Repository Defense in Depth
Christiana Lui, Systems Performance Analyst
Performance Assessment and Integration Section
High-Level Waste and Performance Assessment Branch
1. Public comments summary
 2. NRC's clarification on
 - Intent of the multiple barriers
 - Regulatory requirements
 - Compliance demonstration
 3. Clarifying Questions
 - Participant discussion
 - Audience comments
- 2:30 p.m. Round Table Discussion on Issues Associated with Repository Defense in Depth
1. What is the best way to achieve repository defense in depth?
 - Participant discussion
 - Audience comments
 2. How best to implement the performance-based approach for multiple barrier demonstration?
 - Participant discussion
 - Observer comments
- 4:30 p.m. Summary and Next Steps
- Summary of round table discussion
Francis "Chip" Cameron, Facilitator
 - Schedule and future activities
Christiana Lui, NRC
- 5:00 p.m. Adjourn

**ROUNDTABLE DISCUSSION ON
DEFENSE-IN-DEPTH AS APPLIED
TO A POSSIBLE REPOSITORY AT
YUCCA MOUNTAIN - Purpose and
Overview**




Dr. Keith I. McConnell
Section Chief
Performance Assessment and Integration Section
U.S. Nuclear Regulatory Commission
November 2, 1999

DEFENSE-IN-DEPTH




- Definition of terms
- Statutory Requirement for Multiple Barriers
- What is the Old Rule on Multiple Barriers
- What is in the New Rule on Multiple Barriers
- Common to Both; Differences
- Reasons for Change

Multiple Barriers




- Statutory Requirement:
 - NWPA 1982 as Amended
 - Provide for the use of a system of multiple barriers

Multiple Barriers




- Old Rule:
 - Overall System Performance Objective - EPA Standard
 - Subsystem Performance Objectives for Particular Barriers
 - Containment in waste packages
 - Restrictions on release rate of any radionuclide
 - Groundwater travel time

Multiple Barriers



- Proposed Rule:
 - Individual Protection Standard
 - Requirements for Barriers
 - Identify
 - Show diversity
 - Define capability
 - Provide technical basis


Multiple Barriers



- Common Features:

Feature	Old Rule	Proposed Rule
Goal to manage uncertainty?	Yes	Yes
Release at safe levels?	Yes	Yes
Engineered and natural barriers?	Yes	Yes
Safety not reliant on one barrier?	Yes	Yes


Multiple Barriers



• Differences:

Differences:	Old Rule:	Proposed Rule:
Quarantine & subsystem goals?	Yes	No
Effect of Barrier interactions considered?	No	Yes
Relating to system performance?	No	Yes


Multiple Barriers



• Reasons for Change:

- Incorporate scientific recommendations
- Incorporate progress in methods
- Incorporate Commission Performance-Based Approach to Regulation
- Provide for a Comprehensive Safety Evaluation
 - Consider barrier interactions
 - Ensure focus is on safety issues

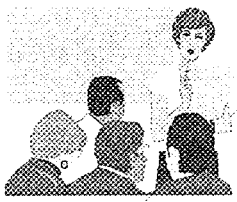
**NRC's Current Thinking On
Multiple Barriers**




Christiana H. Lui
Division of Waste Management
U. S. Nuclear Regulatory Commission
November 2, 1999

What Has The Public Said?

- ◆ Use the approach in the old rule
- ◆ Use the approach in the proposed rule
- ◆ Use the approach in the proposed rule with clarification




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**What Is The Intent Of
Multiple Barriers?**

- ◆ NRC's safety philosophy
- ◆ An assurance requirement to provide confidence that
 - ✓ Known uncertainties are addressed
 - ✓ The repository system is sufficiently robust to account for imperfect knowledge


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**What Is Required Of DOE For
Multiple Barriers?**

- ◆ Assess all significant negative impacts on safety
- ◆ Identify all the positive aspects (barriers)
- ◆ Describe capabilities of the barriers


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**What Is Required Of DOE For
Multiple Barriers? (Cont.)**

- ◆ Perform additional calculations to show safety does not depend on a single barrier
- ◆ Provide technical basis


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**How Can DOE Demonstrate
Multiple Barriers?**

- ◆ Quantify a barrier's ability to
 - ✓ Prevent or substantially delay water or radioactive material movement
 - ✓ Otherwise enhance safety


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How Can DOE Demonstrate Multiple Barriers? (Cont.)

- ◆ Perform a separate analysis to quantify the reserve capacity of a barrier assuming under-performance


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What Is In NRC's Review?

- ◆ Determine if DOE has demonstrated compliance with all requirements
 - ✓ Conduct detailed technical evaluation of DOE's work
 - ✓ Make a determination of acceptability
 - ✓ Conduct independent, confirmatory audit calculations to probe DOE's analysis


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What Is In NRC's Evaluation Of Multiple Barriers?

- ◆ Content of DOE's demonstration of compliance
 - ✓ Data collected and quality
 - ✓ Conceptual models
 - ✓ Mathematical models
 - ✓ Application of models and data in demonstration
 - ✓ Results and conclusions


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What Is In NRC's Evaluation Of Multiple Barriers? (Cont.)

- ◆ Determined whether DOE has shown that
 - ✓ The repository meets applicable regulations
 - ✓ Both geologic and engineered barriers contribute to safety
 - ✓ The repository system has the ability to compensate for under-performance of any one barrier


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Summary

- ◆ Clarify the intent of multiple barriers requirement in the proposed rule
- ◆ Potential methods DOE can use to demonstrate barrier capabilities
- ◆ NRC will not grant a license if DOE's multiple barrier demonstration is insufficient

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Schedule And Future Activities

◆ Final Rule and Rev. 0 Yucca Mountain Review Plan	Due to the Commission by March 31, 2000
◆ Dialog with stakeholders and NRC's Advisory Committees	Continue
◆ Future revisions of Yucca Mountain Review Plan (will formally invite public comments)	Rev. 1 by September 30, 2000 Rev. 2 by September 30, 2001