NUCLEAR WASTE TECHNICAL REVIEW BOARD
FULL BOARD MEETING

SUBJECT: DECIDING WHEN ENOUGH IS ENOUGH

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Overview

- Who decides and on what basis?
- What are the questions?
- How are decisions made?
- When are decisions made?
Who Decides and on What Basis?

**Designer**
- Design adequate for intended use

**Site Data Providers**
- Data and interpretation ready for scrutiny

**Performance Analyst**
- Models valid and code predictions reliable

**DOE Management**
- Acceptable management risks

**Regulatory Analyst**
- Multiple lines of reasoning support compliance

Recommend or disqualify site

Submit license application, if suitable

Regulator
- Reasonable assurance achieved

4DWHRDPT.125.NWTRB/4-21-93
Who Decides and on What Basis?

- Providers of Site Data: data and interpretation ready for scrutiny by others

- Designer: design is adequate for intended purpose

- Performance Analyst: validity of models adequate and code predictions reliable for use in predicting performance

- Regulatory Analyst: multiple lines of reasoning provide basis for demonstrating compliance

- DOE: management risks acceptable to proceed

- Regulator: reasonable assurance has been achieved
What are the Questions?

Providers of Site Data

What means are available to understand current site conditions and processes?

How can the potential for changes in site conditions and processes be established?

How will I ensure I have representative data?
What are the Questions?
(Continued)

**Designer**

Are data adequate to support design?
Is the design constructable?
Is the design sufficiently optimized?
Is there sufficient design safety margin?

**Preliminary Drawing of Repository Complex**
What are the Questions?
(Continued)

Performance Analyst

Are models valid for their intended use?

Do plausible alternative models exist?

Do alternative models produce significantly different results?

Are codes verified?
What are the Questions?
(Continued)

Regulatory Analyst

What regulatory questions need to be answered?

Does consensus exist about the preferred site model/models?

Do alternative models produce significant differences in results?

Do predictions meet regulatory criteria?

Are there multiple lines of evidence supporting compliance?
What are the Questions?

(Continued)

DOE

Is performance appropriately allocated among system elements?

What is value of obtaining additional site data vs. cost?

What is cost/benefit of additional performance assessment?

How strong is the case for compliance?
What are the Questions?

Regulator

Must determine:

“...there is reasonable assurance that ...radioactive materials can be received, possessed, and disposed of in a geologic repository operations area...without unreasonable risk to the health and safety of the public...” [60.31(a)]
What Tools can Assist Decision-Making?

- Providers of Site Data: Scientific method, expert judgment, peer review
- Designer: Applicable design codes, safety factor evaluations
- Performance Analyst: Sensitivity and uncertainty analysis, expert judgment
- Regulatory Analyst: Applicable precedent, weight of multiple lines of evidence
- DOE: Formal peer reviews, expert judgment, feedback from oversight groups and regulator, decision analysis
- Regulator: Weight of evidence, expert judgment, independent evaluations
DOE Perspective
When are Decisions Made?

Major Milestones
Regulatory Compliance Process
Site Suitability
Performance Assessment
Repository/Waste Package
ESF Construction & Testing
Site Investigation
Surface Based Testing

Extreme Erosion T.R.
Seismic Hazards Methodology T.R.
Calcite-Silica T.R.
Interim AO Evaluation
Interim Licensing Evaluation
Interim Qualifier/Disqualifier Evaluation
Interim Sufficient Evaluation
Final Sufficient Evaluation

SEES

ACD
Main Drift
North Ramp
South Ramp
Main Test Area
Cross Drifts
Calico Hills Drifting

Geologic Sub-Models
Hydrologic Sub-Models
Geochemistry Sub-Models
Climatology Sub-Models

Geology
Hydrology
Geochemistry
Climate

Final Models
Final Site Model for LA

Trenching and Drilling

When are Decisions Made?

Interim DEIS FEIS Data SRR LA
Suitability Freeze
Complete AO for Sufficiency Determination
Incorporate Congressional Approval into LA

Request Certification from LSS Administrator

Site Suitability Evaluation

LA

4DWHRDSP2.125.NWTRB/4-21/22-93
An Iterative Process is Used for Evaluating Site Suitability

- Characterize site and develop design
- Evaluate site against DOE siting guidelines
- Siting decision
  - Continue
  - Recommend site
  - Abandon site
Suitability Decisions

- Early Site Suitability Evaluation recommended Ground-Water Travel Time as an area requiring more study before a suitability decision could be made.

- DOE decision--allocate resources to ensure that high-priority surface-based and underground geohydrologic tests are accomplished and data evaluated in a timely manner.
Current Issue Resolution Process

- Site Characterization
- Engineering Design; ESF, Repository, Waste Package
- Performance Assessment
- Regulatory Analyses: Evaluate Site Suitability, Identify issues for Topical Reports, Annotated Outline
- Topical Report: Extreme Erosion
- Topical Report: Seismic Hazard Methodology
- Draft Format and Content Regulatory Guide
- NRC Staff review and provide comments
Issue Resolution Process

- From suite of potential issues, identify candidates for early resolution
  - site conditions and processes understood
  - consequences for performance documented and acceptable
  - evidence supporting compliance adequate to proceed

For each issue:

Determine if Topical Reports or other actions (e.g., rulemaking) are necessary

Prepare Topical Reports as needed and include information in Annotated Outline
Ongoing Issue Resolution Initiative

To NRC 9/92  
LA Annotated Outline Rev 1

To NRC 3/93  
Extreme Erosion Topical Report

To NRC 3/93  
Draft Volcanism Technical Report

To NRC 5/93  
LA Annotated Outline Rev 2

To NRC 9/93  
Seismic Hazard Methodology Topical Report

To NRC 11/93  
LA Annotated Outline Rev 3

Volcanism Probability/Consequence Topical Report

Other Actions Underway

Substantially Complete Containment

Ground-water Travel Time
Deciding When Enough is Enough

- **Data Provider**
  - No
  - Adequate Confidence in Conclusions
  - Yes

- **Designer**
  - No
  - Adequate for Intended Use
  - Yes

- **Performance Analyst**
  - No
  - Uncertainties Identified & Impacts Understood
  - Yes

- **Regulatory Analyst**
  - No
  - Adequate Weight of Evidence
  - Yes

- **DOE**
  - No
  - Benefits of Decision Outweigh Risks
  - Yes

- **Regulator**
  - No
  - Reasonable Assurance About Safety
  - Yes