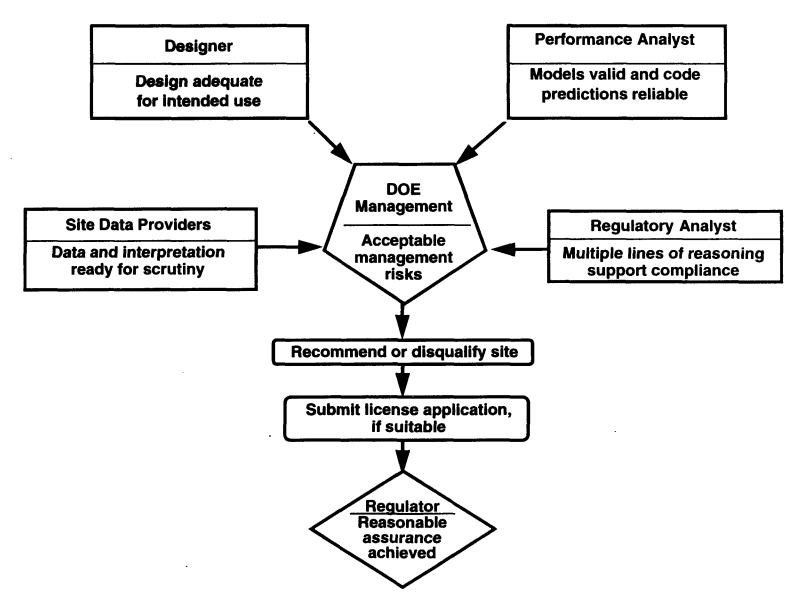
OFFICE OF (	U.S. DEPARTMENT OF ENERGY CIVILIAN RADIOACTIVE WASTE MANAGEMENT
	ASTE TECHNICAL REVIEW BOARD FULL BOARD MEETING
SUBJECT:	DECIDING WHEN ENOUGH IS ENOUGH
PRESENTER:	DR. J. RUSSELL DYER
PRESENTER'S TITLE AND ORGANIZATION:	DIRECTOR, REGULATORY AND SITE EVALUATION DIVISION U.S. DEPARTMENT OF ENERGY LAS VEGAS, NEVADA
PRESENTER'S TELEPHONE NUMBER:	(702) 794-7586

,

# **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?



### 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:** 

DOE:

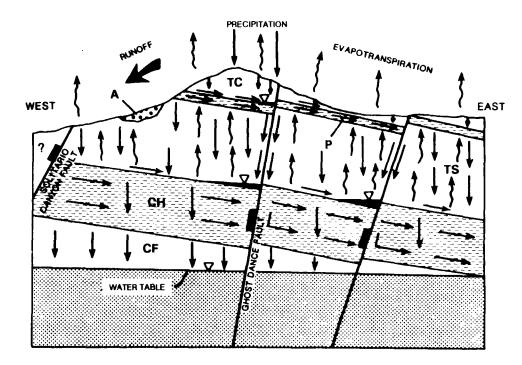
**Regulator:** 

- multiple lines of reasoning provide basis for demonstrating compliance
- management risks acceptable to proceed
  - reasonable assurance has been achieved

4DWHRDPT.125.NWTRB/4-21-93

#### **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?



(Continued)

#### Designer

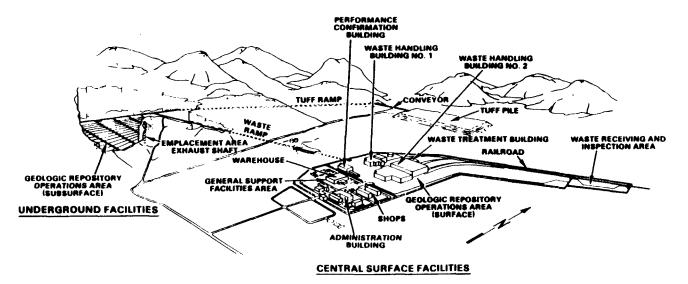
Are data adequate to support design?

Is the design constructable?

Is the design sufficiently optimized?

Is there sufficient design safety margin?

**Preliminary Drawing of Repository Complex** 



(Continued)

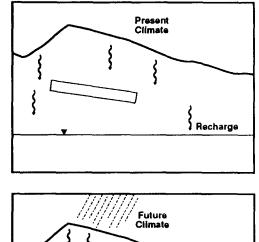
#### **Performance Analyst**

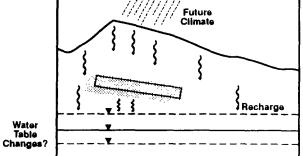
Are models valid for their intended use?

Do plausible alternative models exist?

Do alternative models produce significantly different results?

Are codes verified?





(Continued)

#### **Regulatory Analyst**

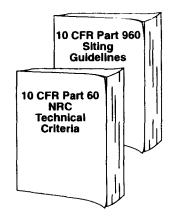
What regulatory questions need to be answered?

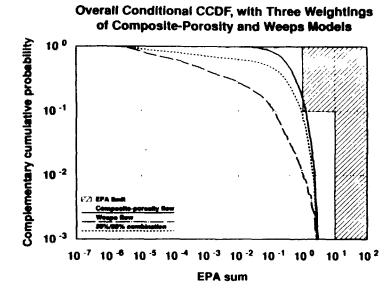
Does consensus exist about the preferred site model/models?

Do alternative models produce significant differences in results?

Do predictions meet regulatory criteria?

Are there multiple lines of evidence supporting compliance?





(Continued)

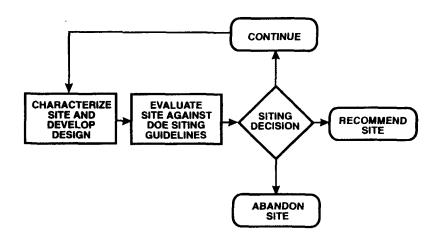
### DOE

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?

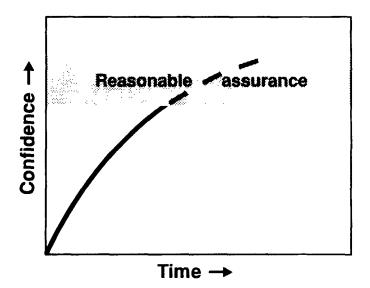


(Continued)

#### 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:

•Designer:

•Performance Analyst:

•Regulatory Analyst:

•DOE:

•Regulator:

Scientific method, expert judgment, peer review

Applicable design codes, safety factor evaluations

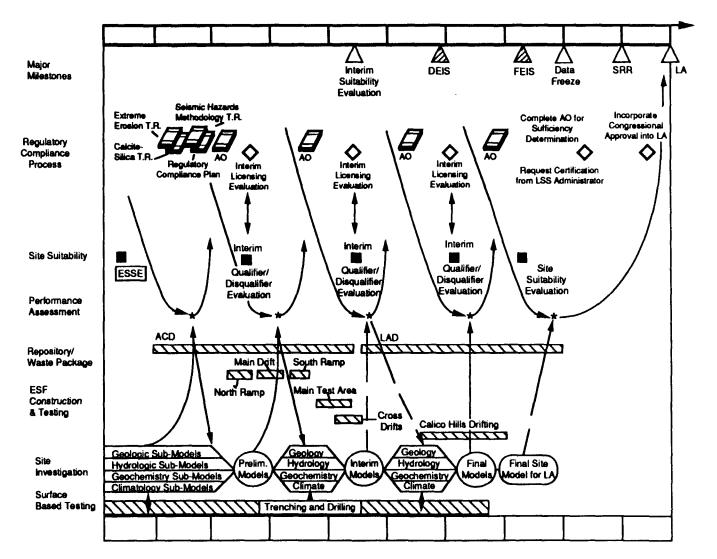
Sensitivity and uncertainty analysis, expert judgment

Applicable precedent, weight of multiple lines of evidence

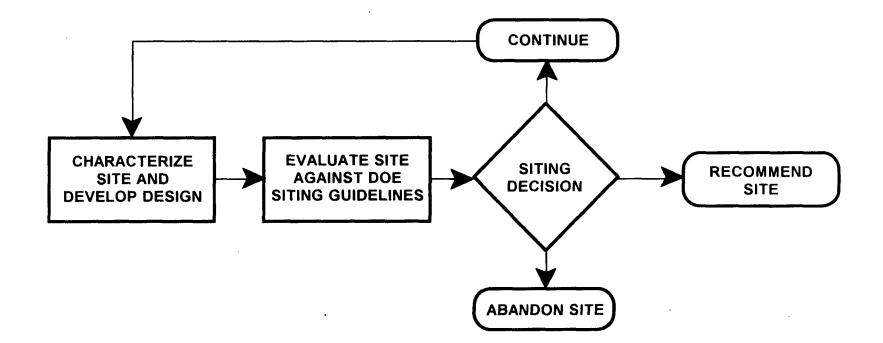
Formal peer reviews, expert judgment, feedback from oversight groups and regulator, decision analysis

Weight of evidence, expert judgment, independent evaluations

### DOE Perspective When are Decisions Made?



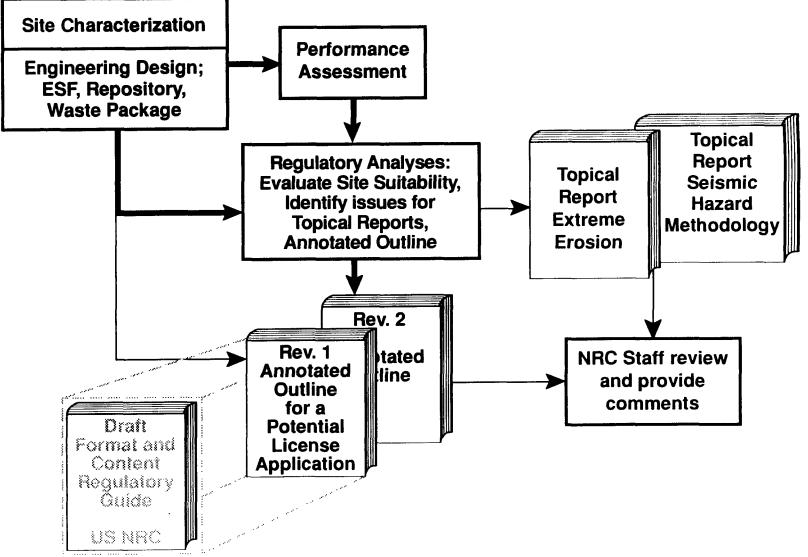
# An Iterative Process is Used for Evaluating Site Suitability



# **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**



## **Issue Resolution Process**

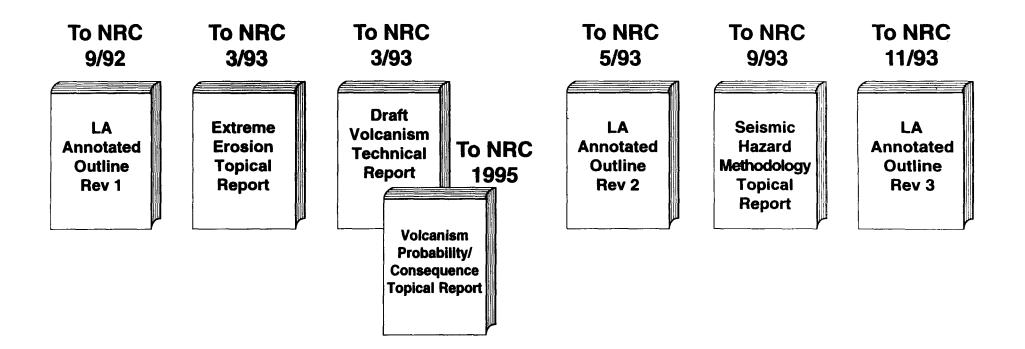
- From suite of potential issues, identify candidates for early resolution
  - site conditions and processes understood
  - consequences for performance documented and acceptable
  - evidence supporting compliance adequate to proceed

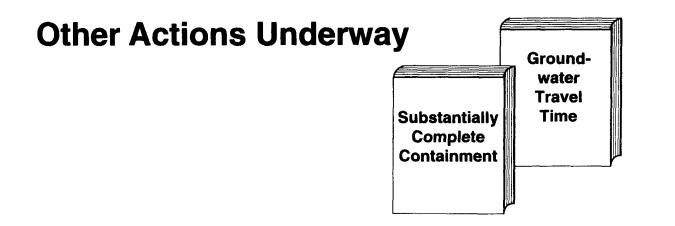
For each issue:

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**





#### 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 Site Characterization Semi-Annual Progress Reports 12/88 SCP 7/89 SCA Study Plan preparation and review LA Final EIS Record of Start Implementation Scoping Decision Obtain Environmental Permits as Needed Plan DEIS FEIS Regutatory & Licensing NRC - meetings and technical exchanges 1 lssue Resolution . Annotated Annotated Annotation Annotated Annotate Outline Outline Outine Outline Outine Annotaled Outline Topical Topical Reports Topical Topical Topical leporte Reports Réporte Reports Site ESSE Recommendation EA Iterative Suitability Assessments (10 CFR 960) Report 5/86 Complete Freeze Start Complete Start site data LAD for Complete LAD ACD ACD LAD for design PA Repository 12/88 SCP CDR Substantially Complete Final Waste Materials tests Containment -EBS data Start ACD Freeze Complete Complete Start Package complete for **Topical Report** LAD for PA LAD ACD LAD Concept to LAD LAD Waste Package EBS PA Ground-water Final model **Travel Time** In-Situ Start PA Complete TSPA complete Topical Report Data TSPA TSPA TSPA Performance PA for LA TSPA for LAD ACD ♦ Assessment Start PA for ACD PA Technical Technica Technica Technical Technica Technica Technica Technical lechnica Technical Report hogen Report Report hood Report sport **hogef** hoge hoport Field Erosion Working Paper Final maps & Preliminary Regional Seismotectonic Model & fracture Climate Final Results Calcite- Seismic Hzrd topical Ste stratigraphic Tectonics Reconstruction Climate Silica report Model mode Topical Rpt Model Models Networks Geology Prehistoric Fracture Final UZ Hvdro-Large Hvdraulic Effects of Climate stratigraphic Model Model for Natural Flooding Hydrology Site Hydrologic Hydrology change onSZ Infiltration Summary Model for LA Hydrology Gradient Draft Pretiminary Topical Fracture Start ESF Bulk Radionuclide Thermo-hydro-chem Model Volcanism Near-Field Report Transport Model Transport Permeability Test Geochemistry Report Model Volcanism Model Data for Data for ramp Seismic repository & surface facility Seismic design data for repository design for ESF data ESF & Repository surface facility design Design Support Start Start Complete Start ESF MTL Start Site ramp-drift In-Situ Ramps-**Final PA** Exploratory Portal Confirmed Preparation construction tests, Drifts Feed Continue Confirmatory Testing

TBM Delivered

Studies Facility

#### Site Characterization Phase of Mined Geologic Disposal System Program

JYNKRPT2 129/4-15-93

### **Deciding When Enough is Enough**

