

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

**PRESENTATION TO  
THE NUCLEAR WASTE TECHNICAL REVIEW BOARD**

**SUBJECT: INTRODUCTION TO  
CALICO HILLS RISK/BENEFIT  
ANALYSIS (CHRBA) AND  
SUMMARY OF RESULTS**

**PRESENTER: DR. DAVID C. DOBSON**

**PRESENTER'S TITLE  
AND ORGANIZATION: CHIEF, REGULATORY INTERACTIONS BRANCH  
YUCCA MOUNTAIN PROJECT OFFICE  
U.S. DEPARTMENT OF ENERGY**

**PRESENTER'S  
TELEPHONE NUMBER: (702) 794-7940**

**JULY 24-25, 1990**

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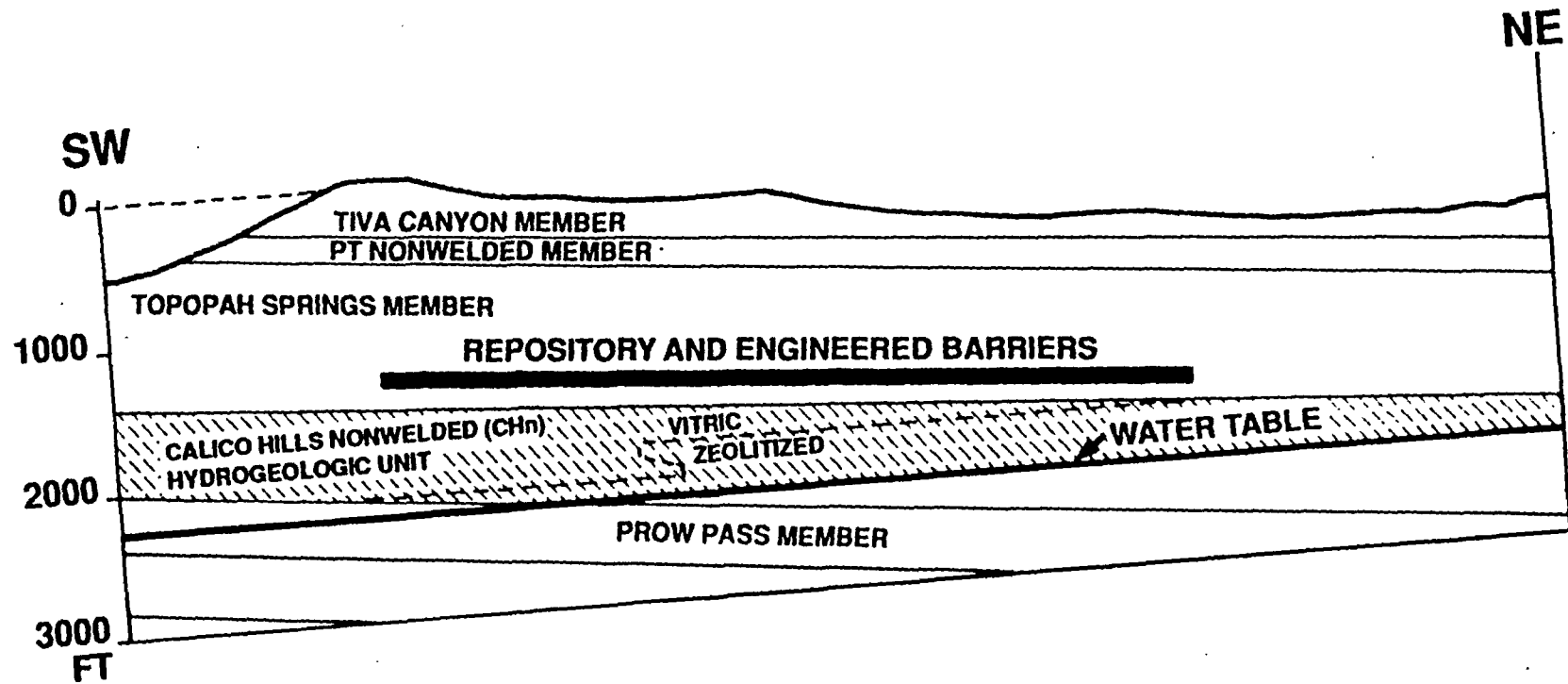
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# INTRODUCTION

- **GEOLOGIC ORIENTATION**
- **RATIONALE FOR THE STUDY**
- **OBJECTIVES AND METHODS FOR THE STUDY**
- **COMPOSITION OF THE TASK GROUP**
- **RESULTS OF THE STUDY**
- **STRUCTURE OF THE PRESENTATION**

# CROSS SECTION SHOWING CHn AT YUCCA MOUNTAIN



# **RATIONALE FOR THE CHRBA**

## **SUMMARY OF NRC OBJECTION #2 TO THE SCP/CD**

- **THE NEED HAS NOT BEEN ESTABLISHED TO EXTEND OR TO DRIFT HORIZONTALLY FROM ES-1 INTO THE CALICO HILLS**
- **POTENTIAL ADVERSE IMPACTS ON WASTE ISOLATION AS A RESULT OF PENETRATING THE CALICO HILLS HAVE NOT BEEN DEMONSTRATED**

# **RATIONALE FOR THE CHRBA**

(CONTINUED)

## **NRC RECOMMENDATION**

- **CONSIDER CHARACTERIZING THE CALICO HILLS WITHOUT PENETRATING THE BARRIER BETWEEN THE REPOSITORY HORIZON AND THE WATER TABLE**
- **A DETAILED DISCUSSION IS NEEDED BY DOE TO SHOW WHY THE BENEFITS OUTWEIGH THE POTENTIAL ADVERSE IMPACTS OF PENETRATING THE CALICO HILLS RATHER THAN OBTAINING THE NECESSARY INFORMATION BY ALTERNATE MEANS**
- **IF ALTERNATE MEANS CANNOT BE DEVELOPED, THEN JUSTIFY DESTRUCTIVE TESTING OF CALICO HILLS; INCLUDE THE CONSEQUENCES OF CONNECTING PATHWAYS FOR RADIONUCLIDES FROM WASTE EMPLACEMENT AREAS TO THE WATER TABLE**

# **RATIONALE FOR THE CHRBA**

**(CONTINUED)**

- **IN THE FINAL SCP, THE DESCRIPTION OF HOW BEST TO CHARACTERIZE THE CALICO HILLS UNIT WAS DEFERRED PENDING COMPLETION OF A RISK/BENEFIT ANALYSIS CONSIDERING:**
  - **NEEDED DATA**
  - **ALTERNATE MEANS OF OBTAINING DATA**
  - **BENEFITS OF OBTAINING THE DATA**
  - **RISKS TO SITE PERFORMANCE BY OBTAINING DATA**
- **THE DOE ALSO COMMITTED TO CONSULT WITH NRC PRIOR TO TAKING ACTION**

# OBJECTIVES AND METHODS

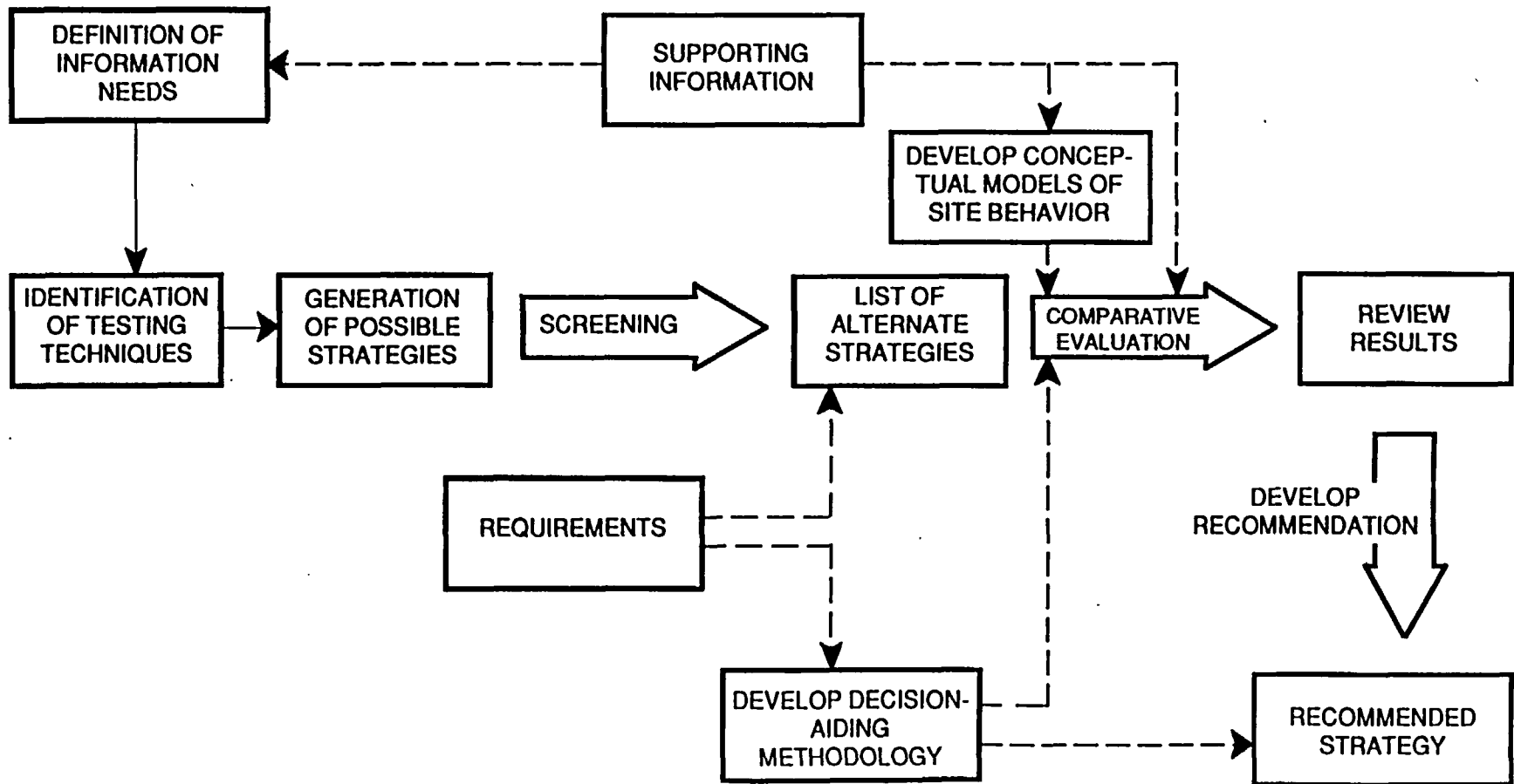
- **THIS STUDY IS BEING CONDUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE YMP QA PROGRAM**
- **THE DOE DECIDED TO CONDUCT THE STUDY IN ACCORDANCE WITH THE PRINCIPLES OF DECISION ANALYSIS**
- **THE TASK GROUP WAS INSTRUCTED TO BASE THE EVALUATION PRIMARILY ON THE CRITERIA IDENTIFIED IN THE NRC OBJECTION**
  - **BENEFIT FROM TESTING**
  - **RISK TO PERFORMANCE**



# **DECISION ANALYSIS (A VALUE OF INFORMATION TECHNIQUE) WAS SELECTED FOR SEVERAL REASONS**

- **TO STRUCTURE THE DECISION PROCESS SO THERE WOULD BE CLEAR DEFINITION OF THE DECISION CRITERIA**
- **THE DECISION REQUIRED CONSIDERATION OF AVAILABLE QUANTITATIVE DATA AND MODEL RESULTS COMBINED WITH EXPERT JUDGEMENT**
- **OBJECTIVE WAS TO COMPARE BENEFITS OF TESTING TO THE POTENTIAL FOR ADVERSE IMPACTS ON SITE PERFORMANCE AS A RESULT OF TESTING**

# STRUCTURE OF THE CALICO HILLS RISK BENEFIT ANALYSIS



# COMPOSITION OF THE TASK FORCE

- **THE CHRBA TASK FORCE IS COMPOSED OF A SMALL GROUP OF SCIENTISTS AND ENGINEERS REPRESENTING THE MAJOR DISCIPLINES IN THE TEST PROGRAM (e.g., HYDROLOGY, GEOLOGY, GEOCHEMISTRY, PERFORMANCE ASSESSMENT, ENGINEERING)**
- **THE TASK FORCE WAS NOT DESIGNED TO INCLUDE ALL POSSIBLE FIELDS OF EXPERTISE, BUT WAS EMPOWERED TO OBTAIN ADDITIONAL EXPERT INPUT WHERE REQUIRED**
  - **FOR EXAMPLE, THE TASK GROUP DID RECEIVE INPUT FROM PROJECT EXPERTS FOR THE ASSESSMENTS OF GEOCHEMICAL RETARDATION AND PERFORMANCE IMPACTS**

# PERSONNEL

<u>NAME</u>	<u>TECHNICAL SPECIALTY</u>	<u>ORGANIZATION</u>
E. BROWNE	DECISION ANALYST	APPLIED DECISION ANALYSIS
H. CALL	DECISION ANALYST	APPLIED DECISION ANALYSIS
B. CROWE	GEOLOGIST/ GEOCHEMIST	LANL
D. DOBSON	GEOLOGIST/ REGULATORY	DOE
E. GARDINER	MINING ENGINEER	SAIC/T&MSS
E. HARDIN	TASK LEADER	SAIC/T&MSS
R. LEE	GEOPHYSICIST	SAIC/T&MSS
B. LEWIS	HYDROLOGIST	USGS
R. PAIGE	GEOLOGIST	T&MSS
J. ROBERTSON	HYDROGEOLOGIST	HYDROGEOLOGIC, INC.
V. ROHRER	COST & SCHED.	T&MSS
S. SINNOCK	PERF. ASSESS.	SANDIA
C. VOSS	MINING ENGINEER/ REGULATORY	GOLDER
D. WONDERLY	DRILLING ENGINEER	REECO

*Callahan*

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# RESULTS OF THE CHRBA

## PREDICTED PERFORMANCE

- **THE ANALYSIS SUGGESTS THAT THE YUCCA MOUNTAIN SITE IS LIKELY TO MEET THE TOTAL SYSTEM PERFORMANCE STANDARD BY A WIDE MARGIN**
- **BECAUSE EXPECTED PERFORMANCE IS VERY GOOD, TEST RESULTS ARE NOT LIKELY TO CHANGE THAT VIEW**

# **RESULTS OF THE CHRBA**

(CONTINUED)

## **IMPACTS**

- **ASSESSMENTS INDICATE THAT THE LIKELY IMPACTS TO PERFORMANCE ARE SMALL FOR ALL CHARACTERIZATION STRATEGIES**

## **BENEFITS OF ADDITIONAL TESTING**

- **ANALYSIS INDICATES SIGNIFICANT DIFFERENCES AMONG STRATEGIES IN ABILITY TO CORRECTLY PREDICT HYDROLOGIC CONDITIONS**
- **TESTING IS LIKELY TO IMPROVE UNDERSTANDING OF SITE CONDITIONS AND INCREASE CONFIDENCE IN PERFORMANCE PREDICTIONS**

# **RECOMMENDATION**

**THE CHRBA TASK GROUP RECOMMENDS THAT THE DOE, AND THE ESF ALTERNATIVES TASK GROUP, SHOULD PLAN FOR CHARACTERIZATION STRATEGIES #2 OR #5, WHICH INVOLVE EXTENSIVE DRIFTING IN THE CH<sub>n</sub> WITHIN THE REPOSITORY BLOCK**

# STRUCTURE OF THE CALICO HILLS RISK/BENEFIT PRESENTATION

