STATE OF NEVADA REVIEW OF THE DOE TECHNICAL BASIS REPORT ON SURFICIAL PROCESSES

Presentation to the
U.S. Nuclear Waste Technical Review Board

by

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BACKGROUND

NWPA 1982 (P.L. 97-425)

- FOUR MAJOR ACTIONS

  1. DETERMINE SITE SUITABILITY UNDER 10 CFR 960 (SITING GUIDELINES)

  2. COMPLY WITH NEPA UNDER 10 CFR PART 1021

  3. IF SITE SUITABLE, SUBMIT SITE RECOMMENDATION REPORT TO PRESIDENT

  4. DEVELOP AND SUBMIT LICENSE APPLICATION TO NRC UNDER 10 CFR PART 60

DOE PROGRAM APPROACH

- TECHNICAL SITE SUITABILITY EVALUATION PROCESS

  — PURPOSE TO DETERMINE SUITABILITY OF SITE FOR A HIGH-LEVEL NUCLEAR WASTE REPOSITORY

  — THREE-STEP PROCESS

  1. TECHNICAL BASIS DOCUMENTATION
  2. GUIDELINE COMPLIANCE ASSESSMENT
  3. DOE CONCLUSIONS RELATIVE TO SITING GUIDELINE COMPLIANCE

TECHNICAL BASIS REPORTS

- PROVIDE DOE'S PRIMARY SCIENTIFIC BASIS FOR ITS LATER ASSESSMENT OF COMPLIANCE WITH EACH SITE SUITABILITY GUIDELINE
- REPORTS WILL PRESENT:
  - — AVAILABLE DATA
  - — CURRENT UNDERSTANDING OF SUBJECT, INCLUDING
    - — UNCERTAINTY
    - — ALTERNATIVE MODELS/HYPOTHESES
    - — BOUNDS ON CONDITIONS AND PROCESSES

TECHNICAL BASIS REPORT FOR SURFACE CHARACTERISTICS, PRECLOSE HYDROLOGY, AND EROSION

- REPORT ISSUED MAY 1995
- PROVIDES DESCRIPTION AND ANALYSES OF SITE CONDITIONS RELATED TO SITING GUIDELINES FOR
  - — EASE AND COST OF SITING, CONSTRUCTION, OPERATION, AND CLOSURE
  - — EXPECTED PRECLOSURE GROUNDWATER CONDITIONS
  - — EROSIONAL PROCESSES

REVIEW PROCESS

DECEMBER 16, 1994, LETTER (LOUX TO DREYFUS) INFORMED DOE THAT NEVADA WOULD CONDUCT AN INDEPENDENT OVERSIGHT TECHNICAL REVIEW OF EACH TECHNICAL BASIS REPORT.

- RESPONSIBILITY TO COMMENT ON DOE'S FINDINGS AND BASIS OF THOSE FINDINGS REGARDING SUITABILITY OF THE YUCCA MOUNTAIN SITE FOR A REPOSITORY.
- EXPECT TO RECEIVE ALL MATERIALS INCLUDING SUPPORTING REFERENCES SIMULTANEOUS WITH DOE'S SUBMISSIONS TO NAS.
- EXPECT DOE TO GIVE EQUAL CONSIDERATION AND WEIGHT TO STATE AND NAS REVIEWS.
- STATE OVERSIGHT REVIEW REPORTS WILL BE SUBMITTED TO DOE ON A SCHEDULE SIMILAR TO THAT EXPECTED FOR NAS REVIEW REPORTS.

FOCUS OF STATE'S REVIEW

- VALIDITY OF SCIENTIFIC DATA AND INTERPRETATIONS
- ADEQUACY OF TREATMENT OF UNCERTAINTIES

BURDEN OF PROOF ON DOE TO DEMONSTRATE A CLEAR AND COMPLETE UNDERSTANDING OF SITE CONDITIONS AND NATURAL PROCESSES OPERATING AT SITE

STATE REVIEW ADDRESSED THE FOLLOWING QUESTIONS:

1. Has the data been collected and analyzed in a technically acceptable manner?
2. Has all available data been taken into account?
3. Do the data, given the associated error and analytical and conceptual uncertainties, support the technical interpretations and conclusions made within the report?
4. Do the technical interpretations and conclusions reconcile or explain all available data?
5. Are there credible alternative interpretations that would significantly alter the conclusions reached?
6. Do the technical interpretations and conclusions reconcile or explain alternative interpretations or conclusions from the data?
7. Do the technical interpretations and conclusions reconcile or explain prior inconsistent conclusions from the data?
8. What testing, if any, would discriminate between alternative technical interpretations?
9. If such testing is recommended, how effective would it be at reducing significant uncertainties?
10. What level of reliance does the report place on expert judgment instead of on additional testing in reaching technical interpretations and conclusions?

PRINCIPAL STATE REVIEWERS

John Bell Nevada Bureau of Mines and Geology	Quaternary Geology/ Geochronology
Dr. John Fordham Desert Research Institute	Water Resources/ Flood Potential
Dr. Martin Mifflin Mifflin and Associates	Subsurface Hydrology/ Quaternary Geomorphic Processes

STATE REVIEW

STATE INITIATED ITS REVIEW IN AUGUST 1995

STATE ISSUED OVERSIGHT TECHNICAL REVIEW REPORT DECEMBER 20, 1995

GENERAL COMMENTS

1. TECHNICAL BASIS REPORT SHOULD FOCUS ON SCIENTIFIC AND TECHNICAL UNDERSTANDING OF THE SITE, RATHER THAN ON SITE SELECTION GUIDELINE COMPLIANCE.

   — FOCUS SHOULD BE RESPONSES TO TECHNICALLY BASED QUESTIONS WHICH REFLECT SCOPE OF GUIDELINES.
   FOR EXAMPLE:

   — Are the processes and events that have resulted in the observed surface characteristics at and in the vicinity of Yucca Mountain sufficiently characterized and understood to permit a reasonably confident projection of the effects of surface processes during the period required for repository activities prior to the postclosure period?

   — Is the hydrology at and around the Yucca Mountain site sufficiently characterized and understood to project with reasonable confidence the effects of hydrologic processes on repository activities, including repository sealing, prior to the postclosure period?

   — Are the erosional processes and erosional history at and around the Yucca Mountain site sufficiently characterized and understood to project with reasonable confidence the range and effects of future erosion processes and rates at the site throughout the repository pre- and postclosure period?

2. TECHNICAL BASIS REPORT SHOULD INCLUDE SUFFICIENT MAPS, CROSS-SECTIONS, AND OTHER GRAPHICS AND TABLES.

3. TECHNICAL BASIS REPORT SHOULD INCLUDE ALL AVAILABLE RELEVANT SCIENTIFIC AND TECHNICAL INFORMATION.

4. TECHNICAL BASIS REPORT IGNORES THE NEAR CERTAINTY THAT THE PRESENT INTERGLACIAL WILL END SOON, WITH THE TRANSITION INTO THE NEXT GLACIAL EPISODE BEGINNING WITHIN THE NEXT FEW THOUSAND YEARS.

5. TECHNICAL BASIS REPORT FAILS TO MEET THE STANDARDS OF A COMPREHENSIVE, SCIENTIFIC DOCUMENT WHICH WOULD PRESENT AND TEST MULTIPLE HYPOTHESES.

SURFACE CHARACTERISTICS COMMENTS

1. THE SELECTION OF A SINGULAR, AND POSSIBLY OUTDATED, SURFICIAL CHRONOLOGY BY THE TBR PUTS A SYSTEMATIC BIAS INTO THE SURFACE PROCESS RATE CALCULATIONS THAT ARE PERFORMED IN THE TBR. THE OMISSION OF OTHER RELEVANT ALTERNATIVE DATA AND THE FAILURE TO EVALUATE THE IMPACT OF THE INHERENT PROBLEMS ASSOCIATED WITH THE URANIUM-TREND TECHNIQUE ARE MAJOR FLAWS IN THE TBR.

EROSION

1. THE TBR CONCLUSION THAT "HILLSLOPE EROSION RATES AT YUCCA MOUNTAIN ... ARE AT LEAST TWO ORDERS OF MAGNITUDE LOWER THAN [THE U.S.] AVERAGE" IS NOT CREDIBLE BASED ON THE LIMITED DATA SETS AND CONCEPTUAL MODELS PRESENTED. A SUBSTANTIAL BODY OF ALTERNATIVE DATA IS NOT CONSIDERED BY THE TBR NOR HAVE ALL RELEVANT DOE AND STATE OF NEVADA DATA BEEN REPORTED.

2. RATES OF STREAM INCISION ALONG FORTYMILE WASH AND TRIBUTARY STREAMS AT THE YUCCA MOUNTAIN SITE ARE POORLY SUPPORTED BY DATA IN THE TBR, AND EXISTING, ALTERNATIVE DATA WOULD SIGNIFICANTLY ALTER THE UNCERTAINTIES AND CONCLUSIONS.

PRECLOSURE HYDROLOGY

1. THE SURFACE FLOODING POTENTIAL PRESENTED IS SEVERELY LIMITED IN SCOPE, ESSENTIALLY CONSIDERING ONLY THE TWO EXPLORATORY STUDIES FACILITY (AND PRESUMABLY REPOSITORY) PORTAL LOCATIONS, AND NO RATIONALE FOR THIS LIMITATION IS PROVIDED.

2. THE EVALUATION OF SUBSURFACE FLOODING POTENTIAL IS INCOMPLETE.

3. THE TBR EVALUATION OF WATER RESOURCE POTENTIAL IS LIMITED AND INADEQUATE.

FINAL THOUGHTS

1. WHAT DO WE KNOW AND WHAT DON'T WE KNOW

   — THE SIGNIFICANT UNCERTAINTY ISSUE

2. UNDERSTANDING SHOULD BE BASED ON DATA, NOT ASSUMPTIONS, OPINIONS, OR BELIEFS

   — THE ISSUE OF ACCOUNTING FOR ALL AVAILABLE DATA

POSTSCRIPT

- DOE HAS ABANDONED PROGRAM APPROACH, INCLUDING TECHNICAL SITE SUITABILITY EVALUATION PROCESS
- PRESENT STRATEGY IS A "VIABILITY ASSESSMENT" FOR A YUCCA MOUNTAIN REPOSITORY. INCLUDES 1998 REPORT ON
  - DESIGN CONCEPT AND PERFORMANCE ASSESSMENT
  - COST AND SCHEDULE FOR:
    - LICENSE APPLICATION SUBMITTAL
    - EIS
    - CONSTRUCTION AND OPERATION

STATE CONCERN

VIABILITY ASSESSMENT PROVIDES FOR NO EXTERNAL PEER REVIEW OR OVERSIGHT