

SITE ASSESSMENT METHODOLOGIES

**Presentation
to**

Nuclear Waste Technical Review Board

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QUESTION:

CAN THE SECRETARY OF ENERGY, UNDER THE EXISTING AND PLANNED DOE REPOSITORY PROGRAM, MAKE AN EARLY DETERMINATION THAT THE YUCCA MOUNTAIN SITE IS DISQUALIFIED FOR GEOTECHNICAL REASONS, AND THEREFORE NOT SUITABLE FOR RECOMMENDATION FOR DEVELOPMENT AS A REPOSITORY?

STATEMENT OF FINDINGS: NO.

THE DEPARTMENT OF ENERGY PROGRAM FOR THE GEOHYDROLOGIC CHARACTERIZATION OF THE YUCCA MOUNTAIN SITE AND DETERMINATION OF ITS SUITABILITY FOR RECOMMENDING ITS DEVELOPMENT AS A HIGH-LEVEL NUCLEAR WASTE REPOSITORY DOES NOT IMPLEMENT THE REQUIREMENTS OF THE NUCLEAR WASTE POLICY ACT, AS AMENDED, AND THE DOE'S GUIDELINES FOR RECOMMENDATION OF SITES (10 CFR PART 960) WITH RESPECT TO EVALUATION OF THE SITE PURSUANT TO DISQUALIFICATION CONDITIONS OF 10 CFR PART 960. FURTHERMORE, THE ENERGY SECRETARY'S NOVEMBER 30, 1989 REVISED PLAN FOR EARLY EVALUATION OF SITE SUITABILITY DOES NOT CORRECT THIS VIOLATION OF STATUTE AND REGULATION IN A MANNER THAT WOULD PERMIT AN EARLY DETERMINATION OF SITE DISQUALIFICATION.

**REQUIREMENTS OF THE NWPA AND DOE GUIDELINES FOR SITE
RECOMMENDATION (10 CFR PART 960) WITH RESPECT TO SITE
DISQUALIFICATION**

"If the Secretary at any time determines the Yucca Mountain site to be unsuitable for development as a repository, the Secretary shall - (A) terminate all site characterization activities at such site. . ."

NWPA, Sec. 113(c)(3)

The Secretary "shall issue general guidelines for the recommendation of sites for repositories. Such guidelines shall specify detailed geologic considerations that shall be primary criteria for the selection of sites in various geologic media. Such guidelines shall specify factors that qualify or disqualify any site from development as a repository . . ."

NWPA, Sec. 112(a)

The intent of the NWPA is unremarkable in its logic and prudence:

The Secretary should screen sites against the guidelines Disqualifying Conditions at all stages of study in order to justify continued costly development of information for the much more rigorous independent licensing proceeding of the NRC.

Organization of DOE Guidelines for Recommendation of Site (10 CFR Part 960)

System Guidelines: Adoption by reference of the licensing regulations of the NRC and EPA (Basis is total system performance)

Technical Guidelines: Relevant geotechnical, socioeconomic, and environmental topics, including specific topics mandated by NWPA

Qualifying Conditions: Total system performance-based at the topical level

Disqualifying Conditions: Based upon specific conditions of the site (eg. geohydrology, tectonics, natural resources, etc.) without total system performance considerations.

Postclosure System Guideline (10 CFR Part 960.4-1)

"The geologic setting at the site shall allow for the physical separation of radioactive waste from the accessible environment after closure in accordance with the requirements of 40 CFR Part 191, Subpart B, as implemented by the provisions of 10 CFR Part 60. The geologic setting at the site will allow for the use of engineered barriers to ensure compliance with the requirements of 40 CFR Part 191 and 10 CFR Part 60."

Postclosure Geohydrology (10 CFR Part 960.4-2-1)

Qualifying Condition:

"The present and expected geohydrologic setting of a site shall be compatible with waste containment and isolation. The geohydrologic setting, considering the characteristics of and the processes operating within the geologic setting shall permit compliance with (1) the requirements specified in 960.4-1 for radionuclide releases to the accessible environment and (2) the requirements specified in 10 CFR Part 60.113 for radionuclide releases from the engineered barrier system using reasonably available technology."

Postclosure Geohydrology (10 CFR Part 960.4-2-1)

Disqualifying Condition:

**"A site shall be disqualified if the pre-waste-
emplacement ground-water travel time from the
disturbed zone to the accessible environment is expected
to be less than 1,000 years along any pathway of likely
and significant radionuclide travel."**

**NOTE: This is more rigorous and absolute than the equivalent
NRC standard (10 CFR Part 60.113, which allows a
reduction of the 1,000 year requirement under certain
projected total system performance conditions.**

Higher Level Disqualification Findings (10 CFR Part 960, Appendix III)

- * **"The evidence supports a finding that the site is not disqualified on the basis of that evidence, and is not likely to be disqualified" - OR -**
- * **"The evidence supports a finding that the site is disqualified or is likely to be disqualified"**

**DOE'S IMPLEMENTATION OF THE REQUIREMENTS OF NWPA WITH
RESPECT TO SITE DISQUALIFICATION**

The statutory bases and criteria for the Secretary's decision as to whether the site is disqualified from further consideration, or qualified for recommendation to the President for NRC repository license application are contained within the DOE guidelines (10 CFR Part 960).

"One of the objectives of site characterization is to collect the data necessary to demonstrate that the site meets the guidelines."

(DOE Yucca Mountain Site Characterization Plan, page I-9)

DOE Mission Plan (June, 1985) established a "Hierarchy of Information Needs" based on:

Key Issues - derived from System Guidelines of 10 CFR Part 960

Issues - based on Qualifying Conditions of the Technical Guidelines of 10 CFR Part 960

Information Needs - technical information needed to resolve the issues

Issues are "unresolved questions related to the performance of a repository." (1985 DOE Mission Plan, page 163)

**DOE Environmental Assessment for Nomination of the Yucca Mountain Site as a Candidate Repository Site determined that no guidelines Disqualifying Conditions are present at the site.
(May, 1986)**

The Issues Hierarchy for a Mined Geologic Disposal System (OGR/B-10), September 1986, modified the Mission Plan issues concept and set the planning course for site investigations and decision points in such a manner as to preclude an early evaluation of specific site data relative to the Disqualifying Conditions of the DOE Guidelines.

Issues Hierarchy (September, 1986)

Key Issues - essentially unchanged in meaning

Performance Issues - can the performance requirements of license regulations be met, and can higher level guidelines findings be made?

Design Issues - can design requirements of license regulations be met?

Characterization Issues - is information sufficient to meet requirements of performance and design issues? (subsumes the Information Needs category of the Mission Plan)

Issue Resolution Strategy of the Issues Hierarchy is license-based, i.e., focus is on total system performance.

There is no plan to evaluate specific site conditions relative to the Disqualifying Conditions of the DOE Guidelines prior to total system performance assessment. This is the final Performance Issue to be resolved before a license application is prepared and the site is recommended by the Secretary as suitable for development of a repository. (Major Decision Points in the Site Characterization Program, SCP, December, 1988, Page 8.5-108)

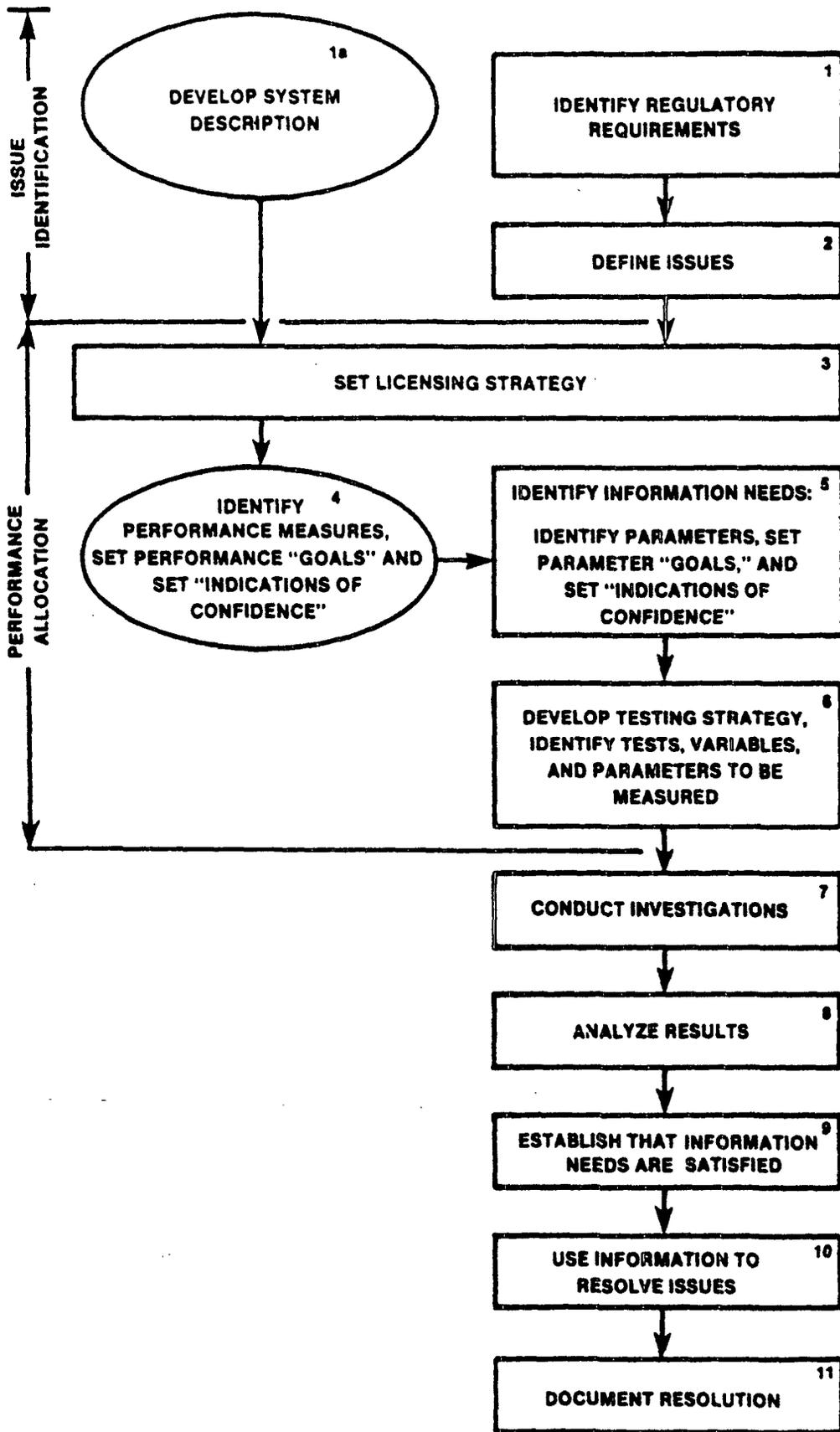


Figure 5. Issue resolution strategy.

The Secretary of Energy's November 1989 restructured program for Yucca Mountain does not change the focus to early evaluation of Disqualifying Conditions during the initial period of surface-based investigations.

"[I]n its near-term scientific investigations of the Yucca Mountain candidate site, the DOE has decided to focus on surface-based testing aimed at evaluating whether the site has any features that would indicate that it is not suitable as a potential repository site. . . . This approach is in concert with a number of suggestions. . . .that scientific investigation activities focus on potentially adverse conditions and that efforts be made to evaluate key suitability issues early in the process."

Secretary of Energy, Report to Congress on Reassessment of the Civilian Radioactive Waste Management Program, November, 1989, page 14.

Key suitability issues are total system performance-based license issues.

Potentially adverse conditions are those of the NRC's 10 CFR Part 60. The license regulations contain no explicit disqualifiers.

"[T]he surface-based testing program will serve to support a decision to proceed with underground work, but will not constitute any establishment of prerequisites for such underground work."

DOE memo: Lake Barrett to Carl Gertz, on confirming [surface-based] test prioritization associated with potentially adverse conditions, October 31, 1989.

"A decision methodology for evaluating site suitability currently does not exist. . . Use of a series of go/no-go decision points is a possible approach."

John Bartlett, OCRWM Designate Director, to U.S. Senators Richard Bryan and Harry Reid, March 6, 1990.

It is true that the amount, type and quality of data from Yucca Mountain are not sufficient to determine that the site, on a total system performance basis is "suitable", or meets with the DOE's Qualifying Conditions of its Guidelines.

The DOE program strategy ignores the vastly different standard of specific site conditions embodied in its guidelines Disqualifying Conditions.

DOE has spent over \$1 billion on Yucca Mountain work since 1983, including drilling over 220 boreholes, excavating 95 trenches and pits, conducting geophysical surveys, etc.

"These initial site activities and the extensive documentation are necessary prerequisites for the unprecedented nature of this mission -- to show that a man-made facility in a stable geologic formation can safely contain radioactive wastes for thousands of years. The rigor of this task is essential to show that all necessary statutory and regulatory requirements can be met and be defensible in a nuclear licensing proceeding."

Secretary Watkins to Senator J. Bennett Johnston, March 1, 1990

A decision methodology does exist for early and ongoing evaluation of the site - it is the DOE's 10 CFR Part 960 guidelines.

The existing data may be sufficient to satisfy the DOE's first statutory responsibility in repository siting - determining whether any guideline Disqualifying Conditions exist at the site.