REGULATORY ANALYSIS

10 CFR PART 63

DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTES
IN A PROPOSED GEOLOGIC REPOSITORY AT YUCCA MOUNTAIN, NEVADA

Background:

Existing Nuclear Regulatory Commission (NRC) regulations at 10 CFR Part 60 contain generic criteria, initially issued in 1983, governing the licensing of the Department of Energy (DOE) to receive and possess source, special nuclear material, and byproduct material at a geologic repository that is sited, constructed, and operated in accordance with the Nuclear Waste Policy Act of 1982 (NWPA). The NWPA required NRC to develop technical criteria for high-level radioactive waste (HLW) disposal that: provide for a system of multiple barriers; include restrictions on retrievability; and are not inconsistent with environmental standards promulgated by the Environmental Protection Agency (EPA) under the NWPA. The NWPA established a site selection process for review and characterization of a number of candidate sites for a repository in different types of geologic media. The NWPA was amended in 1987, redirecting the national waste repository program to focus exclusively on the Yucca Mountain, Nevada, site as a potential geologic repository.

The Energy Policy Act of 1992 (EnPA) made additional changes to the HLW repository program. It directed EPA to issue public health and safety standards for HLW disposal at Yucca Mountain to be based upon and consistent with a National Academy of Sciences (NAS) study of the technical bases for public health and safety standards governing the Yucca Mountain repository.[1] The NRC was directed to modify its technical requirements and criteria for geologic repository disposal to be consistent with the new EPA standards. The EnPA directed NRC to do so within 1 year of promulgation of the final EPA standards.

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[1] "Technical Bases for Yucca Mountain Standards", National Academy Press, Washington, DC, 1995.

The NRC published proposed 10 CFR Part 63-- Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada, on February 22, 1999 (64 FR 8640). The EPA published its proposed standards for Yucca Mountain, 40 CFR 197, on August 27, 1999 (64 FR 46976), and its final standards on June 13, 2001 (66 FR 32073).

The DOE program for characterization of the Yucca Mountain site as a potential geologic repository is proceeding. The DOE issued a Science and Engineering Report for the site recommendation decision on May 4, 2001. Also on May 4, 2001, DOE issued a supplement to its draft Environmental Impact Statement (EIS) for public comment. A final EIS is expected to be issued in late 2001. A site suitability recommendation may be made by late 2001. If the recommendation is approved, DOE could submit a license application to NRC in 2002.

During the approximately 18 years since 10 CFR Part 60 was promulgated, there has been considerable evolution in the capability of technical methods for assessing the performance of a geological repository at Yucca Mountain. These changes call into question the utility of the generic criteria in Part 60 for evaluating conditions at Yucca Mountain that were not envisioned when these criteria were established, and suggest that alternatives to the generic criteria in Part 60 need to be considered for Yucca Mountain to avoid the imposition of unnecessary or potentially ambiguous requirements. The NRC is establishing standards for Yucca Mountain in a new Part 63, which would be applicable only to Yucca Mountain, while retaining the existing Part 60.

Existing Regulatory Framework:

Part 60 contains NRC's regulations governing HLW disposal. The procedural portion of Part 60 was promulgated in 1981 (46 FR 13971; February 25, 1981), and technical criteria were promulgated in 1983 (48 FR 28194; June 21, 1983). Part 60 was amended in 1985 to add specific criteria for disposal in the unsaturated zone (50 FR 29641; July 22, 1985). Procedural amendments reflecting the passage of the NWPA were published in 1986 (51 FR 27158; July 30, 1986). Procedures for implementation of the National Environmental Policy Act with respect to geologic repositories for HLW were added to Part 60 in 1989 (54 FR 27864; July 3, 1989).

In 1996, NRC amended Part 60 to update generic criteria for preclosure activities at a repository site (61 FR 64267; December 4, 1996). These changes sought, in part, to achieve greater consistency between those criteria and the Commission's licensing requirements for independent storage of spent fuel and HLW at 10 CFR Part 72.

The technical requirements of Part 60 contain overall and subsystem performance standards as well as siting and design criteria for preclosure operations and for long-term post-closure performance. Overall system performance criteria and subsystem performance criteria for the engineered barrier system and the geologic setting of the repository are contained in Subpart E, § 60.113.

Statement of the Problem:

The NRC is directed by statute (EnPA) to carry out a rulemaking to modify its standards for geologic repository disposal within a very short period of time following publication of final EPA standards. Thus, many of the normal alternatives considered in a regulatory analysis, such as the "no action" alternative, are not available to NRC and are not part of this regulatory analysis. The legislation also places very restrictive limits on what type of standards EPA is to establish. EnPA specifies that NRC's regulations be consistent with standards established by EPA for Yucca Mountain. The EPA's standards must "prescribe the maximum annual effective dose equivalent to individual members of the public from releases to the accessible environment from radioactive materials stored or disposed of in the repository," and EPA's standards must be "based upon and consistent with the findings and recommendations of the National Academy of Sciences."[2]

Due to the statutory directives in EnPA, the NRC does not have the option of examining and selecting appropriate types and levels of public health and safety standards. For this reason, this analysis does not examine the costs/benefits of varying the type and level of repository performance standards.

[2] EnPA, sec. 801.

The NRC's guidance on preparation of a regulatory analysis provides for a more limited analysis in special cases such as this.[3] This Regulatory Analysis examines the options that are open to NRC in carrying out the statutory directive of EnPA.

Objective of the Rulemaking:

Modify technical requirements and criteria to ensure adequate public health and safety standards for disposal of high-level radioactive waste at Yucca Mountain, consistent with NWPA and EnPA.

Discussion of Alternatives:

1. Alternative 1: Promulgate a New, Separate Part of NRC Regulations, Part 63, That Would Apply Only to Yucca Mountain, Leaving Part 60 as Written.

Under this alternative, NRC would develop an entirely new set of requirements and criteria exclusively for Yucca Mountain, 10 CFR Part 63. While the technical criteria for Part 63 would be developed in accordance with statutory direction in EnPA and be significantly different from Part 60's technical criteria, other sections of the rule such as administrative and procedural sections, would be basically the same as in present Part 60, with only minor wording modifications to reflect the applicability to Yucca Mountain rather than a generic site. Part 60 would not be changed and would remain part of the regulations, but would no longer be applicable to Yucca Mountain.

Advantages:

a. Allows NRC to specify concise, site-specific criteria for Yucca Mountain that are consistent with current assumptions, with site-specific information and performance assessment experience, and with standards from EPA which are for Yucca Mountain alone.

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[3] "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," NUREG/BR-0058, Revision 3, 2000. p. 28.

b. Is the most direct means to establish a coherent body of risk-informed, performance-based criteria for Yucca Mountain, consistent with NRC's philosophy of risk-informed, performance-based regulation.

c. Generic requirements remain intact and in place, if needed, for sites other than Yucca Mountain. Although the application of these standards in their present form might be difficult, NRC would have time and resources in future years to amend generic standards for any additional repository site which may be authorized.

d. Is more likely to permit NRC to comply with the time frame mandated by EnPA, and by DOE's needs for an NRC standard to be in place.

e. For the purpose of clearly establishing the applicability of each HLW part, at the same time Part 63 is promulgated, Part 60 will be amended to state explicitly that Part 60 does not apply to Yucca Mountain.

Disadvantages:

a. Regulatory uncertainties identified in Part 60 may need to be addressed in the future if other sites are considered for licensing.

b. Retaining Part 60, unmodified, might pose some regulatory uncertainty if the new criteria for Yucca Mountain are perceived to be less stringent than generic criteria that remain in force, and which still could be applied, at least in principle, to another site.

The NRC estimates that the resources needed to carry out this alternative are 7.1 person-years for NRC staff time needed to develop the regulation. At prevailing NRC labor rates, this translates into $884,000.

2. <u>Alternative 2: Promulgate Revisions to Part 60 to Apply Only to Yucca Mountain, Eliminating any Generic Regulations</u>.

Under this alternative, Part 60 would be revised in accordance with EnPA to apply only to Yucca Mountain. The generic criteria in Part 60 would be eliminated and replaced by site-specific criteria for Yucca Mountain. The NRC would have no regulations for disposal of HLW in geologic repositories other than Yucca Mountain.

Advantages:

a. Allows the Commission to replace existing regulations with site-specific criteria, for Yucca Mountain, that are consistent with current assumptions, with site-specific information and performance assessment experience, and with dose or risk standards.

b. Would remove from NRC regulations generic criteria that were developed assuming different EPA standards, and outdated understanding of repository performance.

c. There could be less regulatory uncertainty in the long run, if another geologic repository is authorized, from this option.

d. There could be a reduced resource commitment, if another geologic repository is authorized.

Disadvantages:

a. May necessitate the development later of additional site-specific criteria for sites other than Yucca Mountain. Should another repository be authorized, NRC would not have in place any generic criteria which could be amended for a future repository site.

b. May prove more time and resource consuming, if NRC finds it necessary to justify deletion of each criterion in Part 60 separately, as irrelevant or unnecessary for Yucca Mountain.

c. Could be interpreted as going beyond statutory direction; EnPA does not explicitly direct NRC either to retain or eliminate generic requirements; EnPA only directs NRC to modify its requirements to be consistent with EPA's Yucca Mountain standards.

The NRC estimates that the resource cost of this alternative is at least as great as for alternative (1), --- $884,000 or more.

Two other options involving revision of generic criteria in Part 60 as well as developing new site-specific regulations for Yucca Mountain were also initially considered but rejected: (1) creation of a new Part for Yucca Mountain while simultaneously updating Part 60, and (2) updating Part 60 in such a way as to include a site-specific subpart for Yucca Mountain. Simultaneously revising generic criteria and developing Yucca Mountain-specific criteria would require more resources than presently available to NRC's HLW program, and considerably more resources than either Alternative (1) or (2). At present, there is no foreseeable need for revised generic requirements and criteria because, among other things, no site other than Yucca Mountain is undergoing characterization as a HLW repository.

Decision Rationale:

The NRC has chosen to pursue Alternative 1, developing a separate standard for Yucca Mountain while retaining a generic HLW repository standard at Part 60. The NRC's decision is based on the following:

(1) This alternative is the most direct way of establishing site-specific standards for Yucca Mountain in accordance with EnPA.

(2) This alternative is the most timely. The timeframe for NRC to promulgate new standards as required by EnPA is very short, less than 1 year. The NRC believes that this is the alternative that has the best chance of being accomplished within this short time horizon.

(3) This alternative leaves a generic standard, Part 60, in place. If NRC is called upon to license another repository, NRC will have a regulatory framework in place, and will be able to make any needed revisions to that framework at that time.

(4) This alternative achieves the objective with the least cost. No alternative can achieve the objective of the action at a lower cost.

Implementation:

The NRC's schedule for completion of a final rule calls for publication in 2001. Necessary guidance material for implementation, the Yucca Mountain Review Plan - Revision 1, is planned for issuance in 2001.

Implications for Other NRC Regulatory Programs:

The previous discussion under "Alternatives" deals with issues which might arise should NRC have to license another geologic repository in addition to Yucca Mountain.

The NRC resources needed for spent fuel storage licensing and regulation would be reduced if promulgation of this rule and DOE actions lead to transfer of spent fuel from spent fuel storage facilities to the proposed geologic repository at Yucca Mountain for emplacement in the repository.

Other than these issues, promulgation of this rule would have no direct implications for other NRC regulatory programs.

Implications for Other Federal Agencies:

Promulgation of the rule will have no adverse impact on DOE's program for geologic repository development. The schedules described here will allow DOE to proceed with its currently stated schedule for licensing.

References:

(1) National Academy Press, Technical Bases for Yucca Mountain Standards, Washington, DC, 1995.

(2) U.S. Congress, Energy Policy Act of 1992, Public Law 102-486.

(3) U.S. Nuclear Regulatory Commission, Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission, NUREG/BR-0058, Revision 3, 2000.