

is reasonably available at the time of docketing. The regulations also require that DOE update the application to permit a timely review before the issuance of a license. These requirements also apply to the repository design.

No changes were made to the Yucca Mountain Review Plan in response to this comment.

*Issue 3:* What is the meaning of the term "operational period"?

*Comment.* One commenter asked for a definition of the term "operational period" as used in Section 4.1.1.1, "Site Description as It Pertains to Preclosure Safety Analysis," of the draft Yucca Mountain Review Plan. The commenter asked whether the term includes emplacement only or also post-emplacement performance monitoring.

*Response.* A definition of the term "operational period" is found in 10 CFR 63.102(c), which states:

\* \* \* A period of operations follows the Commission's issuance of a license. The period of operations includes the time during which emplacement of waste occurs; any subsequent period before permanent closure during which the emplaced wastes are retrievable; and permanent closure, which includes sealing openings to the repository. Permanent closure represents the end of the performance confirmation program; final backfilling of the underground facility, if appropriate; and the sealing of shafts, ramps, and boreholes.

Since this definition is included in 10 CFR part 63, no changes were made to the Yucca Mountain Review Plan.

#### 4.2 Waste Retrieval Operations

*Issue 1:* Does the Yucca Mountain Review Plan adequately address waste retrieval operations?

*Comment.* Commenters raised questions regarding waste retrieval. One commenter asked for: (i) Any assumptions associated with waste retrieval; (ii) the time frame after closure for retrieval; and (iii) the number of years after closure during which it would be possible to retrieve waste. The same commenter stated that once waste retrieval criteria are established, they must not be watered down. A commenter stated that a "high-speed, fast and dirty" retrieval procedure should be established to respond to sudden, catastrophic events. Other commenters stated that the Yucca Mountain Review Plan should require DOE to physically show it can remotely emplace and retrieve disposal canisters.

*Response.* The Commission has previously addressed issues related to retrievability of waste from a high-level waste repository at Yucca Mountain (66 FR 55743, November 2, 2001) and

indicated that a physical demonstration of retrievability would not be necessary for a construction authorization.

Some commenters were concerned that NRC's proposed regulations required DOE to submit plans for retrievability, but did not require an actual demonstration that the plans were feasible. Some commenters suggested that the NRC should require DOE to demonstrate the feasibility of its retrieval plans. \* \* \* If necessary to protect public health and safety, waste package retrieval in a deep geologic repository would be a first-of-a-kind endeavor with unique engineering and geotechnical challenges. The Commission recognizes that the retrieval operation would be an unusual event, and may be an involved and expensive operation (U.S. Nuclear Regulatory Commission, "Staff Analysis of Public Comments on Proposed Rule 10 CFR part 60, 'Disposal of High-Level Radioactive Wastes in Geologic Repositories,'" Office of Nuclear Regulatory Research, NUREG-0804, December 1983; p. 11). As such, DOE can expect that its plans and procedures in this area will receive extensive, detailed review by the NRC staff as part of any construction authorization review. The feasibility and reasonableness of DOE's retrieval plans will be reviewed by the NRC staff at the time of the license application submittal. \* \* \* However, the Commission does not envision that DOE will need to build full-scale prototypes of its retrieval systems to demonstrate that its retrieval plans are practicable at the time of construction authorization. Rather, DOE needs to design (and build) the repository in such a way that the retrieval option is not rendered impractical or impossible.

With regard to the time frame for waste retrieval, the Commission stated (66 FR 55743, November 2, 2001):

Some commenters expressed a belief that the period of waste package retrieval could be accomplished beyond 50 years, and there should be flexibility for extending the period of retrievability to longer time periods. One commenter suggested that the repository should be monitored to determine if there will be problems (e.g., too high a temperature, too much water inflow) that would require the waste to be retrieved. The same commenter suggested that stewardship of the waste be maintained (indefinitely) so that waste could be made available for future energy needs. \* \* \* The 50-year limit on waste retrieval operations was adopted from the generic requirements found at Part 60. At the time Part 60 was first promulgated, the Commission solicited comment on what was then a proposed 100-year retrieval period (46 FR 35282; July 8, 1981). However, after an analysis of public comments, it was determined that the Commission's earlier proposal was excessive, and the shorter 50-year period was decided [upon] (U.S. Nuclear Regulatory Commission, "Staff Analysis of Public Comments on Proposed Rule 10 CFR part 60, 'Disposal of High-Level Radioactive Wastes in Geologic Repositories,'" Office of Nuclear Regulatory Research, NUREG-0804, December 1983). In specifying this time period, the Commission noted that the 50-

year period was "provisional" and subject to possible modification (i.e., longer periods) in light of both the planned waste emplacement schedule and completion of the performance confirmation program and a review of those results. After 50 years of waste emplacement operations and performance confirmation, the Commission previously reasoned, it is likely that significant technical uncertainties will be resolved, thereby providing greater assurance that the performance objectives will be met. It should be noted that DOE is free to design the repository for retrieval periods greater than 50 years. In fact, the Commission understands that DOE is contemplating working designs that may provide for a retrieval period of up to 300 years. \* \* \* Thus, as recommended in this comment, allowance for longer waste retrieval periods greater than 50 years is permitted under the regulation. As for longer retrieval periods that would permit the recovery of the high-level waste as a potential resource, the Commission has previously noted that its retrieval provision is not intended to facilitate recovery. Waste retrieval is intended to be an unusual event only to be undertaken to protect public health and safety.

The Commission also generally addressed assumptions about waste retrieval (66 FR 55743, November 2, 2001):

One commenter inquired as to the disposition of the waste if it is determined that retrieval is necessary. \* \* \* Part 63 does not specifically address any required actions for the handling of retrieved waste from an operating geologic repository, but \* \* \* Section 63.21(c)(7) [in the final rule] does require that DOE's Safety Analysis Report include a description of its plans for the alternate storage of the radioactive wastes, should retrieval be necessary. Retrieved waste would need to be controlled in compliance with applicable regulations at the time of retrieval.

DOE must justify in a license application any assumptions used in its plans for waste retrieval. DOE must demonstrate that the repository is designed to allow retrieval in a manner that would protect health and safety as well as keeping radiation exposures as low as is reasonably achievable. Neither the Nuclear Waste Policy Act nor 10 CFR part 63 include a requirement for an expedited retrieval in case of sudden catastrophic events, however, NRC would require actions necessary to protect health and safety.

No changes were made to the Yucca Mountain Review Plan in response to this comment.

*Issue 2:* Does the Yucca Mountain Review Plan adequately address plans for alternate storage of waste?

*Comment.* One commenter stated that DOE did not address alternate storage of waste in the Yucca Mountain Final Environmental Impact Statement. The commenter asked whether, by including