

not materially adverse to the long-term safety of the repository.” Petition at 41–43.

In proposing part 63, the Commission specified overall performance objectives for the preclosure and postclosure phases of the repository and requirements that compliance with these overall performance objectives be demonstrated through an integrated safety analysis of preclosure operations, and through a performance assessment for long-term, post-closure performance. The proposal did not specify potentially adverse conditions to be considered but did require that the performance assessment consider unfavorable, as well as favorable, information:

A defensible performance assessment should contain a technical rationale for those features, events, and processes that have been included in the performance calculation, as well as those that have been considered but were excluded. The features, events, and processes (*i.e.*, specific conditions or attributes of the geologic setting; degradation, deterioration, or alteration of the engineered barriers; and interactions between the natural and engineered barriers) conducted for inclusion in the assessment should represent a wide range of beneficial and detrimental effects on performance.

(64 FR 8650; February 22, 1999). Public comments on the proposed rule raised concerns about the impacts of certain features, events, and processes (*e.g.*, that YM lies in an area that is seismically and tectonically active, that there may be potential for fast ground-water pathways to the water table) that prompted many commenters to recommend that YM be disqualified from further consideration. The Commission considered these objections but reaffirmed the approach it had decided to take in the proposed rule:

Consideration of all FEPs, especially those with the potential to have an adverse effect on performance, is an important part of the evaluation of repository performance. Commenters have correctly identified a number of conditions that have been or are being considered by DOE in performance assessments for Yucca Mountain, such as seismic activity, thermal effects, volcanic activity, microbial-induced corrosion of the waste package, and the potential for a significant rise of the water table. Section 63.114 requires DOE to consider all FEPs pertinent to a repository at Yucca Mountain and fully justify how they are treated in the performance assessment. In reviewing DOE's performance assessment, the NRC will evaluate how well DOE has accounted for those FEPs that could have an adverse effect on the repository.

(66 FR 55748; November 2, 2001). Thus, the Commission considered in the part 63 rulemaking whether it should specify disqualifying conditions for the

repository site, but decided that its approach of having the performance assessment present and consider all information relevant to negative conditions was preferable. The Commission finds no reason presented by petitioner to reopen that issue.

Peak Radiation Doses Subsequent to the Regulatory Monitoring Period

Petitioner requests that § 63.113 be amended to add the following provision:

Peak Dose. The geologic setting for the Yucca Mountain repository shall evidence sufficient geologic suitability to provide reasonable assurance that peak radiation doses to the accessible environment will not occur subsequent to the regulatory monitoring period established by the Environmental Protection Agency in 40 CFR part 197.

Petition at 43. This requirement is purportedly needed because, in petitioner's view, “the repository will become most dangerous to humans and the environment after the EPA's prescribed regulatory time period.” Petition at 33 (emphasis in original). Petitioner supports this view with a graphic produced in the July 2002 *National Geographic* using data provided in DOE's *Final Environmental Impact Statement*, DOE/EIS-0250 (February 2002). Petition, Attachment 2. According to petitioner, this graphic illustrates that “DOE's own models predict that radiation doses from Yucca Mountain releases to the accessible environment will not begin to peak until after the 10,000-year regulatory time period that forms the basis for part 63 licensing.” Petition at 33.

Petitioner believes that NRC must have reasonable assurance that the peak radiation doses to the accessible environment will occur within the regulatory compliance period.¹¹ This amounts to a challenge to the 10,000 year compliance period adopted by the Commission in Part 63. The Commission proposed a 10,000 year compliance period for evaluating a YM repository because it:

(1) includes the period when the waste is inherently most hazardous; (2) is sufficiently long, such that a wide range of conditions will occur which will challenge the natural and the engineered barriers, providing a reasonable evaluation of the robustness of the geologic repository; and (3) is consistent with other regulations involving geologic disposal of long-lived hazardous materials, including radionuclides.

¹¹ We interpret petitioner's reference to “the regulatory monitoring period established by the Environmental Protection Agency in 40 CFR 197” to be a reference to the 10,000 year compliance period established in EPA's regulations. Those regulations do not include a monitoring period.

(64 FR 8647; February 22, 1999). The Commission acknowledged that, on this matter, it was not following the recommendation made by NAS that the compliance period should include the time when greatest risk occurs, within the limits imposed by the stability of the geologic system. However, the Commission explained:

In selecting the length of time over which the individual dose limit should be applied, a regulatory agency must take into account technical, policy, and legal considerations. In fact, NAS noted that EPA might elect to establish consistent policies for managing comparable risks from disposal of long-lived hazardous materials. From a technical perspective, for example, the time-dependent variation of the hazard, along with the time required to evaluate adequately the waste isolation capability of both engineered and natural barriers, are of significance. From a policy perspective, on the other hand, the practical utility and relative uncertainty of extremely long projections of health consequences, along with the need to maintain a consistent regulatory approach for like hazards, need to be weighed. Having considered both technical and policy concerns, the Commission is proposing the use of 10,000 years for evaluating compliance with the system performance objective at § 63.113.

Id. The Commission received comments objecting to this proposal, but decided to reaffirm use of a 10,000 year compliance period in the final rule:

The fact that it is feasible to calculate performance of the engineered and geologic barriers making up the repository system for periods much longer than 10,000 years does not mean that it is possible to make realistic or meaningful projections of human exposure and risk, attributable to releases from the repository, over comparable time frames. NAS acknowledged that projecting the behavior of human society over long periods is beyond the limits of scientific analysis and recommended that “cautious, but reasonable” assumptions, based upon current knowledge, be made with regard to the selection of biosphere and critical group parameters for Yucca Mountain. Determining just how far into the future current knowledge can no longer support “reasonable” assumptions about pathways affecting human exposure is clearly a subjective, policy judgment. NRC believes that, for periods approaching 1,000,000 years, as suggested by NAS, during which significant climatic and even human evolution would almost certainly occur, it is all but impossible to make useful and informed assumptions about human behaviors and exposure pathways.

(66 FR 55760; November 2, 2001).

Thus, the Commission has considered the appropriate length of the compliance period and has determined that 10,000 years is an acceptable period for assessing compliance with performance standards. The