

*Issue 2:* Has an evaluation of the characteristics of the controlled area been included in the Yucca Mountain Review Plan?

*Comment.* One commenter stated that no mention could be found in the Yucca Mountain Review Plan of the size and location of the controlled area. The commenter argued that specification of the controlled area is a key factor in the licensing process and must be addressed in a license application and in the NRC review.

*Response.* The controlled area is defined by 10 CFR part 63.302. This is addressed in Section 4.1.1.1, "Site Description as It Pertains to Preclosure Safety Analysis", of the draft Yucca Mountain Review Plan.

The Yucca Mountain Review Plan was modified to include reference to the controlled area, where appropriate.

*Issue 3:* Does the Yucca Mountain Review Plan adequately evaluate radiation exposures during the preclosure operations at a potential high-level waste repository at Yucca Mountain?

*Comment.* One commenter noted that the Yucca Mountain Final Environmental Impact Statement indicated that the predominant radiological impacts during the preclosure period would be from radon releases. The commenter stated that the Yucca Mountain Review Plan does not address radiological safety associated with potential radon releases and associated worker exposures. The commenter suggests that these potential safety issues be added to the review.

*Response.* Safety issues related to radiation exposure, including radon, during the preclosure period are covered in the Yucca Mountain Review Plan. DOE is required by 10 CFR 63.111 to use a preclosure safety analysis to evaluate compliance with performance objectives for the preclosure period. A preclosure safety analysis proceeds from an identification of hazards, events, and event sequences to assessments of consequence and risk. This process includes an evaluation of radiation hazards and risks. The Yucca Mountain Review Plan reflects a thorough review of DOE's preclosure safety analysis as set forth in Section 4.1.1, "Preclosure Safety Analysis," of the draft Yucca Mountain Review Plan.

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

#### 4.5 Structures, Systems, and Components of the Subsurface Facility

*Issue:* Will the design, construction, control, and quality assurance of the waste canisters be adequate?

*Comment.* Commenters expressed a number of concerns about the standards to be used for waste canisters. One commenter raised a number of concerns regarding how the quality assurance requirements would be met for structures, systems, and components important to safety, safety controls, and measures to ensure availability of safety systems.

*Response.* If the waste canisters are important both to safety and to waste isolation, their design, manufacture, and performance would be subject to NRC's quality assurance requirements. These requirements are defined in 10 CFR part 63, subpart G, and are consistent with NRC's quality assurance standards for other nuclear facilities. DOE must satisfy these quality assurance requirements by performing planned and systematic actions necessary to provide confidence that the geologic repository and its structures, systems, and components will perform satisfactorily.

The regulations require that quality assurance requirement for systems, structures, and components be evaluated during a licensing review for a high-level waste repository at Yucca Mountain. NRC staff would use the quality assurance requirements in 10 CFR part 63, subpart G to determine whether the program was adequate.

No changes were made to the Yucca Mountain Review Plan as a result of this comment.

#### 4.6 Alternative Designs

*Issue:* Should alternative designs be examined in a license application for a high-level waste repository at Yucca Mountain?

*Comment.* One commenter was concerned that nowhere in the Yucca Mountain Review Plan is there clear direction to NRC staff reviewers to ensure that DOE, in its application and supporting documents, has adequately considered alternative repository designs. The commenter noted that the subject is touched on in draft Yucca Mountain Review Plan Section 4.3, "Research and Development Program to Resolve Safety Questions," however, this section does not specifically address alternative designs, outside of the scope of the research and development program, to resolve safety questions.

The commenter noted that because DOE's design could be contested during licensing, and Nye County, Nevada, the Nuclear Waste Technical Review Board, and others believe that a cooler repository would reduce uncertainties in long-term performance, NRC staff reviewers should take steps to ensure

that the DOE license application is complete and of high quality on that issue. The commenter concluded that a thorough and comprehensive test of DOE's design, specifically with respect to reducing thermal effects and the potential for water to contact the waste packages, should be a minimum test of the adequacy and completeness of a DOE license application for a high-level waste repository at Yucca Mountain.

*Response.* The question as to whether DOE must consider alternative repository designs was previously addressed by the Commission in its "Statement of Considerations" for 10 CFR part 63 (66 FR 55748-55749, November 2, 2001) as follows:

The Commission agrees with the comments and has removed [this requirement to evaluate alternative designs] from the regulations. The NRC review should focus on the safety aspects of DOE's proposed approach. DOE should only be required to propose alternatives from its proposed approach in areas where the NRC review determines DOE's approach is deficient. When developing proposed part 63, the NRC staff adopted this requirement from 10 CFR part 60, the existing generic NRC high-level waste disposal regulation, which contains a similar requirement in 10 CFR 60.21(c)(1)(ii)(D). At the time of the issuance of part 60, DOE objected to this specific requirement with basically the same argument presented for Part 63. In the "Statement of Considerations" for part 60 (published in [the] **Federal Register** [notice] on June 21, 1983; 48 FR 28194), the Commission justified the requirement by stating "If the Commission finds, on the basis of its review, that the adoption of some alternative design feature would significantly increase its confidence that the performance objectives would be satisfied, and that the costs of such an approach are commensurate with the benefits, it should not hesitate to insist that the alternative be adopted."

The decision to require DOE to submit alternatives for certain site design features was a discretionary action on the part of the Commission as nothing (in either the Atomic Energy Act of 1954, as amended, or the Nuclear Waste Policy Act of 1982, as amended) required the Commission to obtain information on alternative designs at the site level. At the time part 60 was initially published (1983), the Commission implemented an appropriate regulatory framework for a generic program facing many uncertainties. Multiple sites with very different geological settings were under consideration. The NRC's generic HLW regulations had to address the resolution of a large number of technical issues in the relative short licensing review period established by the Nuclear Waste Policy Act of 1982. With all the uncertainties in the program, the Commission believed it was important to require design alternatives be submitted with the application to increase the probability of NRC approval of the license application within the three-year schedule mandated by Congress.