

operations equipment could be disposed of; (iv) whether radioactive chemical wastes could be interred; and (v) whether contaminated soils or contaminated mine tailings could be disposed of.

**Response.** The types and forms of waste that could be disposed of in a repository for high-level radioactive waste at Yucca Mountain are based on Section 2 of the Nuclear Waste Policy Act, as amended, and are defined in NRC regulations at 10 CFR 63.2. High-level waste means: (i) The highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material, derived from such liquid waste, that contains fission products in sufficient concentrations; (ii) irradiated reactor fuel; and (iii) other highly radioactive material that the Commission, consistent with existing law, determines, by rule, requires permanent isolation. Also, 10 CFR 63.2 defines radioactive waste as high-level waste and radioactive materials other than high-level waste that are received for emplacement in a geologic repository.

The Commission addressed the question of liquid wastes in its "Statement of Considerations" for 10 CFR part 63 (66 FR 55773, November 2, 2001), which states:

Because of processing in the nuclear fuel cycle, some high-level waste can occur in the liquid (aqueous) state. However, this waste type is not expected to be disposed of at Yucca Mountain. Rather, liquid high-level waste will be vitrified—mixed with molten glass and solidified—to reduce the actual volume of waste and make it easier to handle.

DOE would have to demonstrate in its license application that wastes that are not the highly radioactive material resulting from the reprocessing of spent nuclear fuel (including liquid waste produced directly in reprocessing and solid material derived from such liquid waste that contains fission products in sufficient concentrations) or irradiated reactor fuel, are wastes that the Commission, consistent with existing law, determines, by rule, requires permanent isolation.

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

### 10.3 The Meaning of Safety

**Issue:** Will results of a review conducted using the Yucca Mountain Review Plan adequately protect health and safety?

**Comment:** One commenter questioned whether a licensing review for a high-level waste repository at Yucca

Mountain that is based on the regulatory requirements in 10 CFR part 63, and that uses the review methods and acceptance criteria in the Yucca Mountain Review Plan, would protect health and safety.

The commenter referred to a dictionary definition of safety as meaning free from danger and involving no risk. The commenter contended that this is the public interpretation of safety, and that agencies of the Federal government use different definitions since the Yucca Mountain Review Plan glossary does not define safety. The commenter assumed that the dictionary definition applies.

The commenter further noted that, when Yucca Mountain was selected as the sole site for characterization as a geologic repository, officials of DOE promised not to build the site if it was unsafe. The commenter stated that DOE often referred citizens to site suitability guidelines that included qualifying and disqualifying conditions. Also, NRC regulations included sub-system requirements that would ensure the site could be licensed only if safety could be assured. The commenter noted that these regulatory provisions have been eliminated and that a safety decision would now be based on the results of performance assessment. The commenter also stated that DOE has redefined safe in terms of satisfying regulations.

**Response.** A decision on whether to authorize construction of a high-level waste repository at Yucca Mountain will be based on whether DOE demonstrates it has satisfied applicable regulatory requirements. The standards for issuance of a construction authorization, for example, include a determination that (1) There is reasonable assurance that the types and amounts of radioactive materials described in the application can be received in the repository without unreasonable risk to public health and safety and (2) there is reasonable expectation that materials can be disposed of without unreasonable risk to public health and safety.

Among the requirements that must be met are the preclosure and postclosure performance objectives that are defined in NRC regulations at 10 CFR part 63. Simply stated, these performance objectives are quantitative radiation exposure limits. The Commission addressed the adequacy of performance assessment for evaluating compliance in its "Statement of Considerations" for 10 CFR part 63 (66 FR 55746–55747, November 2, 2001) as follows.

Although repository postclosure performance is evaluated with respect to a single performance measure for individual protection, the NRC considers a broad range of information in arriving at a licensing decision. In the case of the proposed repository at Yucca Mountain, Part 63 contains a number of requirements (*e.g.*, qualitative requirements for data and other information, the consideration and treatment of uncertainties, the demonstration of multiple barriers, performance confirmation program, and QA program) designed to increase confidence that the postclosure performance objective is satisfied. The Commission will rely on the performance assessment as well as DOE's compliance with these other requirements in making a decision, if DOE submits a license application for disposal of HLW at Yucca Mountain. The Commission believes the approach for performance assessment in the proposed rule is appropriate and it is retained in the final rule. However, requirements for QA, multiple barriers, and performance confirmation have been revised to clarify the Commission's intent for these requirements \* \* \*

The Commission believes that there have been significant advances in, and experience with, risk assessment in the past 20 years (see Commission's white paper on Risk-Informed and Performance-Based Regulation, March 1999). The Commission continues to believe that a performance assessment, developed with sufficient credibility, is the best means to provide useful information to the Commission for making an informed, reasonable licensing decision. The Commission recognizes, however, the uncertainties inherent in evaluating a first-of-a-kind facility like the repository and in estimating system performance over very long time periods (*i.e.*, 10,000 years). Thus, proposed Part 63 contained requirements to ensure that: (1) Uncertainties inherent in any performance assessment are thoroughly articulated and analyzed or addressed; (2) DOE's performance assessment is tested (corroborated) to the extent practicable; and (3) there are additional bases, beyond the performance assessment, that provide confidence that the postclosure performance objectives will be met.

In essence, safety is defined by 10 CFR part 63. A determination as to whether a repository for high-level radioactive waste at Yucca Mountain can be operated safely will be based on the information presented in a license application, and the evidence presented in the adjudicatory proceeding before the NRC.

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

### 10.4 Reasonable Assurance and Reasonable Expectation

**Issue:** Does the difference in the meanings of the terms "reasonable assurance" and "reasonable expectation" need to be clarified?