



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON NUCLEAR WASTE
WASHINGTON, D.C. 20555

March 1, 1991

The Honorable Kenneth M. Carr
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Chairman Carr:

SUBJECT: COMMENTS ON 10 CFR PART 60.113, SUBSYSTEM REQUIREMENTS

In response to a request from Commissioner James R. Curtiss, the Advisory Committee on Nuclear Waste has for the past several months examined the subsystem performance requirements of 10 CFR Part 60, with specific attention being directed to the following two questions:

1. If a site meets the standards for a high-level radioactive waste repository as promulgated by the U.S. Environmental Protection Agency (EPA, 1985), does that ensure that the site will meet the subsystem performance requirements of the U.S. Nuclear Regulatory Commission (NRC, 1983a) in 10 CFR Part 60?
2. If a site meets the NRC subsystem performance requirements, does that ensure that the EPA standards will be met?

The answer to both of these questions is "No." In the course of our deliberations we examined a range of issues on this subject. Through this letter, we share with you our observations and recommendations.

Subsystem Performance Requirements

According to the NRC regulations, a mined geologic repository will limit the rate of waste (radionuclide) release to the accessible environment by means of an engineered barrier system (EBS) and the geologic setting (natural system). The two systems differ in their contribution to isolation and in the associated degree of confidence. The EBS is expected to be the main barrier during the times or conditions when the response of the system is most uncertain, and the geologic setting will provide the major barrier to releases over the long term. This approach conforms with the long-established NRC policy of providing for defense in depth.

Of the three subsystem performance requirements specified in 10 CFR Part 60.113, the first two relate to the EBS, the third relates to the geologic setting, as follows:

1. "Containment of HLW within the waste packages will be substantially complete for a period to be determined by the Commission ... provided that such period shall be not less than 300 years nor more than 1,000 years after permanent closure of the geologic repository"
2. "The release rate of any radionuclide from the engineered barrier system following the containment period shall not exceed one part in 100,000 per year of the inventory of that radionuclide calculated to be present at 1,000 years following permanent closure"
3. "... pre-waste-emplacment groundwater travel time along the fastest path of likely radionuclide travel from the disturbed zone to the accessible environment shall be at least 1,000 years"

In addition to these requirements there is a statement (10 CFR Part 60.112) that the overall system performance objective is to have the repository "conform to ... environmental standards for radioactivity as may have been established by the Environmental Protection Agency with respect to both anticipated processes and events and unanticipated processes and events." The NRC regulations also include language that permits the Commission to allow flexibility in the application of each of its subsystem requirements, "... provided that the overall system performance objective, as it relates to anticipated processes and events, is satisfied."

Relation Between Subsystem Requirements and the EPA Standards

Interaction with the NRC staff has revealed that no deliberate attempt was made to relate the NRC subsystem requirements to the EPA standards.

1. Information developed by the NRC staff clearly tends to confirm the lack of a nexus. For example, Table 1, Appendix A, of the EPA standards provides maximum release limits for a range of radionuclides anticipated to be present in an HLW repository. Calculations show that, if radionuclides are annually released at a rate of one part in 100,000 of the inventory at 1,000 years (as specified in the NRC subsystem requirements), the quantities of certain isotopes of plutonium and americium released could be much larger than the limits specified in the EPA standards (NRC, 1983b).

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2. It is also probable that compliance with the EPA standards might be accomplished without conforming to one or more of the NRC subsystem requirements. For example, a repository that meets the EPA standards might very well have a groundwater travel time of less than 1,000 years.
3. Commissioner Curtiss inquired also about the stringency of the NRC subsystem requirements. The necessity of complying with two sets of regulations would appear to place an added burden on the licensee. The stringency of the NRC requirements, however, cannot readily be evaluated against the EPA standards because (a) the NRC subsystem requirements were not based on the EPA standards and (b) a comparison of the NRC and EPA requirements needs to be site specific.

Summary Comments

In summary, our conclusions and observations are as follows:

1. There is no nexus between the EPA standards and the NRC subsystem requirements. This is not an oversight; apparently no nexus was intended. As long as the NRC regulations include 10 CFR Part 60.112, this situation is primarily a regulatory issue, not a technical issue. It is not a matter that will compromise the protection of public health and safety.
2. Meeting the subsystem requirements specified in the NRC regulations does not ensure compliance with the EPA standards; the converse is also true. The NRC staff should be encouraged to continue to issue statements clarifying the subsystem requirements so that they are less subject to misinterpretation.
3. Both the EPA standards and the NRC regulations include statements that are designed to permit flexibility in their application. Implementing the flexibility, however, may be difficult particularly (as pointed out by Commissioner Curtiss, 1990) under the intense public scrutiny anticipated at the time the licensing process will be underway.
4. It appears likely that the applicant for an HLW repository license will need to address the NRC and the EPA requirements separately. This appears to be true not only because there seems to be no technical relation between the two sets of regulations, but also because demonstration that the facility can meet both sets of requirements appears as an inherent part of the regulations. In our opinion, the health and safety of the public is not likely to be impaired by this situation. We are not able to comment on the purely regulatory or legal aspects of the dual regulatory impacts of the subsystem requirements.

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We trust these comments will be helpful.

Sincerely,



Dade W. Moeller
Chairman

References:

[Curtiss, 1990]. Curtiss, James R., "Repository Performance -- The Regulatory Challenge," Paper presented at Symposium on Radioactive Waste Repository Licensing, National Academy of Sciences, National Research Council, Washington, DC, September 17, 1990.

[EPA, 1985]. U.S. Environmental Protection Agency, "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes," Title 40, Part 191, Code of Federal Regulations, Washington, DC, 1985.

[NRC, 1983a]. U.S. Nuclear Regulatory Commission, "Disposal of High-Level Radioactive Wastes in Geologic Repositories," Title 10, Part 60, Code of Federal Regulations, Washington, DC, 1983.

[NRC, 1983b]. 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,'" Report NUREG-0804, Washington, DC, December 1983.