

STAFF POSITION 60-002

"PERFORMANCE OBJECTIVES RELATING TO ISOLATION OF THE WASTE"

Division of High-Level Waste Management  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission

August 8, 1990

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Staff Position SP 60-002

SUBJECT: THE MEANING OF THE PHRASE "PERFORMANCE OBJECTIVES RELATING TO ISOLATION OF THE WASTE" [10 CFR 60.122(a)]

THE QUESTION: In 10 CFR 60.122, "Siting Criteria," what performance objectives are encompassed by the phrase "performance objectives relating to isolation of the waste"?

STAFF POSITION: In 10 CFR 60.122(a), the phrase "performance objectives relating to isolation of the waste" refers to the performance objectives set out in 10 CFR 60.112, "Overall System Performance Objective for the Geologic Repository After Permanent Closure," and 10 CFR 60.113, "Performance of Particular Barriers After Permanent Closure," but does not refer to the performance objectives set out in 10 CFR 60.111.

ISSUANCE DATE: August 8, 1990

DISCUSSION:

The text of 10 CFR 60.122(a) is attached. This section contains the phrase "performance objectives relating to isolation of the waste" in several places. The question is: What are the "performance objectives relating to isolation of the waste" that must be considered? The term "isolation of waste" is discussed in 10 CFR 60.102, "Concepts," and is as follows:

"(e) Isolation of waste. (1) During the first several hundred years following permanent closure of a geologic repository, when radiation and thermal levels are high and the uncertainties in assessing repository performance are large, special emphasis is placed upon the ability to contain the wastes by waste packages within an engineered barrier system. This is known as the containment period. The engineered barrier system includes the waste packages and the underground facility....

(2) Following the containment period special emphasis is placed upon the ability to achieve isolation of the wastes by virtue of the characteristics of the geologic repository. The engineered barrier system works to control the release of radioactive material to the geologic setting and the geologic setting works to control the release of radioactive material to the accessible environment. Isolation means inhibiting the transport of radioactive material so that amounts and concentrations of the materials entering the accessible environment will be kept within prescribed limits." [emphasis in original]

It is clear that the term isolation is used only in reference to the period following permanent closure. The performance objectives for the period of repository operations contained in 10 CFR 60.111 relate to radiation protection during preclosure repository operations and do not pertain to isolation of the waste following permanent closure. Therefore, the staff has concluded that the preclosure performance objectives of 10 CFR 60.111 are unrelated to waste isolation and are not encompassed by the term "performance objectives relating to isolation of the waste" in 10 CFR 60.122.

The performance objectives of 10 CFR 60.112, which implement the overall U.S. Environmental Protection Agency (EPA) Standard in 40 CFR 191 by reference, establish limits for amounts and concentrations of material entering the accessible environment following permanent closure. Thus, it is clear that in using the term "performance objectives relating to isolation of the waste," the Commission had in mind at least the overall EPA Standard.

The staff considers that the performance objectives set out in 10 CFR 60.113 also relate to isolation of the waste and that they should be considered when applying 10 CFR 60.122. Justification for this position can be found in the Statement of Considerations accompanying the proposed technical criteria for Subpart E in 10 CFR Part 60, 46 FR 35280, July 8, 1981 (at 35283-84). There, the Commission observed that in order to have confidence in the ability of a geological repository to contain and isolate the wastes for an extended period of time, the repository must consist of multiple barriers - specifically, it concluded, two major engineered barriers (waste packages and underground facility), in addition to the natural barrier provided by the geological setting. The Commission emphasized these elements "...to take advantage of the opportunity to attain greater confidence in the isolation of the waste."

It is clear, therefore, that when the Commission referenced "performance objectives relating to isolation of the waste," it had in mind the multiple performance objectives set out in 10 CFR 60.113 as well as the overall EPA Standard that is implemented by 10 CFR 60.112.

This staff position reflects sound policy considerations. It calls for the applicant to consider the siting criteria, as specified in 10 CFR 60.122, to demonstrate - for each of the relevant performance objectives referenced above - that the favorable conditions together with the engineering barrier system are sufficient to provide reasonable assurance that such objectives will be met and that any potentially adverse condition will not compromise the ability of the geologic repository to meet such objectives. If the applicant is unable to make such a demonstration, it seems unlikely that it could otherwise satisfy the requirements of 10 CFR 60.113 that the Commission so emphasized.

Finally, it should be noted that the current position is a clarification of the applicability of 10 CFR 60.122. It does not modify the performance objectives. In fact, the scope of 10 CFR 60.122 is limited by the specific language of those performance objectives. In particular, the position does not imply the need for additional analysis of favorable or potentially adverse conditions, where such conditions have no relevance to a given performance objective.



Robert M. Bernero, Director  
Office of Nuclear Material Safety  
and Safeguards

Attachment:  
10 CFR 60.122(a) Text

ATTACHMENT

TEXT FROM SECTION 10 CFR 60.122(a)

(1) A geologic setting shall exhibit an appropriate combination of the conditions specified in paragraph (b) of this section so that, together with the engineered barrier system, the favorable conditions present are sufficient to provide reasonable assurance that the performance objectives relating to isolation of the waste will be met.

(2) If any of the potentially adverse conditions specified in paragraph (c) of this section is present, it may compromise the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. In order to show that a potentially adverse condition does not so compromise the performance of the geologic repository the following must be demonstrated:

(i) The potentially adverse human activity or natural condition has been adequately investigated, including the extent to which the condition may be present and still be undetected taking into account the degree of resolution achieved by the investigations;

(ii) The effect of the potentially adverse human activity or natural condition on the site has been adequately evaluated using analyses which are sensitive to the potentially adverse human activity or natural condition and assumptions which are not likely to underestimate its effect; and

(iii)(A) The potentially adverse human activity or natural condition is shown by analysis pursuant to paragraph (a)(2)(ii) of this section not to affect significantly the ability of the geologic repository to meet the performance objectives relating to isolation of the waste, or

(B) The effect of the potentially adverse human activity or natural condition is compensated by the presence of a combination of the favorable characteristics so that the performance objectives relating to isolation of the waste are met, or

(C) The potentially adverse human activity or natural condition can be remedied.

Finally, it should be noted that the current position is a clarification of the applicability of 10 CFR 60.122. It does not modify the performance objectives. In fact, the scope of 10 CFR 60.122 is limited by the specific language of those performance objectives. In particular, the position does not imply the need for additional analysis of favorable or potentially adverse conditions, where such conditions have no relevance to a given performance objective.

(Signed) Robert M. Bernero

Robert M. Bernero, Director  
Office of Nuclear Material Safety  
and Safeguards

Attachment:  
10 CFR 60.122(a) Text

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