



**POLICY ISSUE**  
**(Information)**

August 20, 1991

SECY-91-266

**For:** The Commissioners

**From:** James M. Taylor  
Executive Director  
for Operations

**Subject:** AMENDMENT TO SECY-91-218

**Purpose:** (1) To inform the Commission of the staff's plans to transmit additional information to EPA.

(2) To inform the Commission of the staff's intent to meet with the Advisory Committee on Nuclear Waste (ACNW) to develop a single set of U.S. Nuclear Regulatory Commission (NRC) answers to questions raised in Working Draft No. 3 of the high-level waste (HLW) standards of the U.S. Environmental Protection Agency (EPA).

**Background:** SECY-91-218 informed the Commission that EPA appeared to be accelerating its schedule for reissuing its standards, and that the staff was preparing more specific analyses and recommendations on some of the staff's proposed comments on Working Draft No. 3.

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**NOTE:** TO BE MADE PUBLICLY AVAILABLE  
WHEN THE FINAL SRM ON SECY-91-218  
IS MADE AVAILABLE

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SECY-91-218 also requested Commission approval to transmit to EPA comments on Working Draft No. 3 of EPA's HLW standards. In addition to its own comments, the staff also proposed to transmit the views of the ACNW on six questions raised by EPA in Working Draft No. 3. On August 6, 1991, Commissioner Remick observed that sending EPA two sets of comments could give a mixed signal of the NRC's views. Commissioner Remick recommended that the staff meet with ACNW to discuss comments on Working Draft No. 3 and inform the Commission of any recommended revisions to the proposed comments to EPA.

Discussion:

In response to EPA's apparent acceleration of its schedule for reissuing its standards, the staff prepared a list of issues likely to arise in public comments on EPA's standards, options for NRC positions on those issues, and recommendations for staff actions to deal with the issues. The issues and options were discussed with Commissioner Curtiss and Commissioners' assistants on August 2, 1991.

The staff recommends two actions related to reissuance of EPA's standards. First, consistent with the staff's proposed comments on Working Draft No. 3, the staff proposes to compile a short bibliography of relevant technical literature on risks associated with radiological safety standards, uranium fuel cycle facilities, and other safety standards and facilities. This bibliography will be transmitted to EPA for use in developing a comparative evaluation of the risks of EPA's HLW standards. Second, the staff will develop example calculations illustrating how compliance might be demonstrated for the probabilistic portion of EPA's standards and for the staff's proposed alternative concept. The examples will attempt to identify any differences in the level of safety that would be imposed by the two concepts. These actions will allow the staff to respond to a July 18, 1991, information request from Margo T. Oge, Acting Director, Office of Radiation Programs at EPA.

The staff will transmit to the Commission for information the list of issues and options, the bibliography, and the example calculations described above.

The staff will meet with ACNW on August 29, 1991. The enclosure to this paper presents the staff's proposal to ACNW for combined responses to the six questions raised by EPA. Before transmitting any comments to EPA, the staff will inform the Commission of the outcome of its meeting with ACNW.

The Commissioners

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The staff requests the Commission to defer action on the staff's proposed comments in SECY-91-218 until the staff informs the Commission of the outcome of its August 29, 1991 meeting with ACNW.

Coordination:

The Office of the General Counsel has reviewed this paper and has no legal objection.

  
James M. Taylor  
Executive Director  
for Operations

Enclosure:  
Proposed combined responses  
to EPA's six questions.

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PROPOSED COMBINED RESPONSES  
TO EPA'S SIX QUESTIONS

Question 1: Two options are presented in Sections 191.03 and 191.14, pertaining to maximum exposures to individuals in the vicinity of waste management, storage, and disposal facilities: a 25 millirems/year effective dose [effective dose equivalent] limit and a 10 millirems/year effective dose limit. Which is the more appropriate choice and why?

ACNW View: 10 millirem/year.

NRC Staff View: 25 millirem/year for 191.03 and 10 millirem/year for 191.14.

Combined Comment: The International Commission on Radiological Protection (ICRP) and the National Council on Radiation Protection and Measurements (NCRP) recommend an overall dose limit of 100 millirem/year averaged over the lifetime of an individual. This limit applies to the total radiation exposure received from all sources and practices excluding medical and natural sources. Exposures of short duration are permitted to be larger, provided that the lifetime average remains within the recommended limit. Because post-closure radionuclide releases from a high-level waste repository, if they occur, could continue for a number of years, EPA's dose limits should be apportioned from the 100 millirem/year recommended limit.

Limits for specific sources of exposure, such as a repository, are to be apportioned in a way that ensures that combined doses from all sources will not exceed 100 millirem/year. For EPA's HLW standards, the proper apportionment must take into account the range of facilities to which the dose limits would be applied. EPA proposes to apply the dose limit of Section 191.03 to the combined doses from HLW facilities and all other uranium fuel cycle facilities. Since the uranium fuel cycle includes several potential sources of exposure, it seems reasonable to allow a relatively large fraction of the overall dose limit for these facilities. Absent a clear demonstration by EPA that the 10 millirem/year limit is necessary to protect public health and safety, 25 millirem/year would be the more appropriate dose limit for the combined doses addressed by Section 191.03.

The proposed dose limit of Section 191.14 would apply only to the projected post-closure performance of a repository -- not to the combined doses from a repository and other sources. For this section, a dose limit of 10 millirem/year would allow an ample margin so that other future sources of radiation exposure would not cause total doses to exceed the limits recommended by ICRP and NCRP.

We also note that sections 191.03 and 191.14 both impose limits on the radiation dose "to any member of the public." Consistent with the recommendations of ICRP and NCRP, EPA should revise these sections to limit the average dose within the "critical group" of individuals expected to receive the largest doses.

Question 2: A new assurance requirement is presented in Section 191.13 that would require a qualitative evaluation of expected releases from potential disposal systems over a 100,000-year timeframe. Are such evaluations likely to provide useful information in any future selecting of preferred disposal sites?

ACNW View: Agreement that 100,000 year evaluations are helpful for site comparisons, but not for evaluating the suitability of a single site.

NRC Staff View: Alternative site comparison is a NEPA issue and is not an appropriate subject to be addressed in EPA's HLW standards. EPA might want to consider whether an environmental standard should be developed for the post-10,000 year performance of a repository.

Combined Comment: We recognize that the specification of the 10,000-year time limit is somewhat arbitrary. It is important that geologic or climatic changes do not occur in the near-term period following the 10,000-year limit if such changes could cause significant releases of radioactive material. The siting criteria and performance objectives of 10 CFR Part 60 are intended to reduce the potential for, and the consequences of, such disruptive changes. Thus, the NRC is sympathetic to EPA's concerns about repository performance in the post-10,000 year period. However, EPA's HLW standards are being promulgated under Atomic Energy Act authority. Accordingly, they should be "generally applicable environmental standards" as defined in Reorganization Plan No. 3 of 1970, that is, "limits on radiation exposures or levels, or concentrations or quantities of radioactive material, in the general environment . . . ." Therefore, we do not believe that a requirement for comparison of alternative sites is an appropriate subject for EPA to address in these standards. Any long-term comparison of candidate sites should be part of a broader evaluation of alternatives under the provisions of the National Environmental Policy Act.

If EPA is concerned that the post-10,000 year performance of a repository could cause significant releases of radioactive material to the environment, an environmental standard, rather than an "assurance requirement," should be considered. Such an environmental standard would provide a basis for judging the acceptability of a single proposed repository site, rather than comparing the merits of alternative sites. However, the large uncertainties in projections of post-10,000 year performance raise questions about the practicality of such a standard. Because 10 CFR Part 60 already contains siting criteria and performance objectives that reduce the potential for significant post-10,000 year releases, NRC recommends that EPA limit application of its standards to 10,000 years.

Question 3: Two options are presented in Sections 191.14 and 191.23, pertaining to the length of time over which the individual and ground water protection requirements would apply: a 1,000-year duration and a 10,000-year duration. Which is the more appropriate timeframe and why?

ACNW View: 10,000 years.

NRC Staff View: EPA has not provided any technical basis to support either period of time.

Combined Comment: EPA states that "our own analyses show that either time frame is achievable." However, we are not aware that EPA has ever published those analyses or subjected them to independent review. NRC urges EPA to make available the analyses that support EPA's views on achievability of the individual and groundwater protection requirements.

More importantly, EPA has not demonstrated that either time period is appropriate for protection of public health or the environment. Other regulatory criteria, including those for disposal of radioactive and non-radioactive hazardous wastes, generally provide protection for shorter periods of time. EPA should explain the basis for believing that a longer period of protection is needed for disposal of high-level radioactive wastes.

Question 4: In Subpart C the Agency [EPA] proposes to prevent degradation of "underground sources of drinking water" beyond the concentrations found in 40 CFR 141--the National Primary Drinking Water Regulations. The Agency is aware, however, that there may be some types of ground waters that warrant additional protection because they are of unusually high value or are more susceptible to contamination. Should the Agency develop no-degradation requirements for especially valuable ground waters? If so, what types of ground waters warrant this extra level of protection?

ACNW View: A no-degradation requirement might be unduly stringent. Instead, potential sites should be rejected if valuable aquifers might be contaminated.

NRC Staff View: The value of an aquifer should be considered during a NEPA analysis, but is not an appropriate subject for EPA's HLW standards. EPA should not impose a no-degradation requirement.

Combined Comment: The NRC staff opposes adoption of a no-degradation requirement for special sources of groundwater. EPA's previous attempt to apply graduated levels of protection to groundwaters of different characteristics caused an unnecessary level of complexity in the standards. The simplicity and improved clarity of the groundwater protection requirements of Working Draft 3 represent a significant improvement over earlier drafts. The NRC staff strongly recommends that EPA not regress to the multiple groundwater classifications and protection levels of earlier drafts, especially in light of the extremely stringent protection levels imposed by the groundwater protection requirements of Working Draft 3.

We believe it is important to recognize that the dose rate from underground sources of drinking water, even if contaminated to the limits specified in the National Primary Drinking Water Regulations, would still contribute only a small fraction (4 percent) of the current long-term dose rate limit (100 millirem/year) for members of the public. Even if EPA adopts a 10 millirem/year individual protection standard for an HLW repository, groundwater complying with the Drinking Water Regulations would contribute no more than 40 percent of the dose rate limit. In this sense, application of the Drinking Water Regulations to a repository represents additional stringency, especially because the primary pathway for public exposures from undisturbed performance of such facilities is through drinking water.

As EPA is aware, long-term projections of the performance of an HLW repository will contain significant uncertainties. These uncertainties might make it impossible to demonstrate compliance with a no-degradation requirement, even for a relatively good site. Thus, a no-degradation requirement could become a de facto criterion for eliminating certain candidate repository sites. Instead, evaluation of the resource value of groundwaters present at a potential site should be made within the context of the National Environmental Policy Act evaluation of alternatives, rather than application of EPA's HLW standards.

Question 5: Two options are presented in Notes 1(d) and (e) of Appendix B pertaining to the transuranic waste unit: a 1,000,000 curies option and a 3,000,000 curies option. Which is the more appropriate TRU waste unit and why?

ACNW View: 3,000,000 curies is the better value.

NRC Staff View: EPA has not provided the technical information to support either value.

Combined Comment: As discussed in Comment No. 1 above, the release limits to which these notes apply were derived from EPA's analyses of the waste-isolation capabilities of a deep geologic repository for spent nuclear fuel. EPA's fundamental premise is that the fractional releases permitted from a transuranic waste disposal facility must be no greater than those thought to be achievable by a spent fuel repository. However, EPA has not demonstrated that the release limits would be technically achievable for a transuranic waste disposal facility using either the 1,000,000- or the 3,000,000-curie option, nor has EPA demonstrated that either option is appropriate for protection of public health or the environment. As noted in Comment No. 1, the NRC staff strongly urges EPA to derive its standards from an evaluation of the acceptability of various risk levels, including those previously determined to be acceptable for uranium fuel cycle facilities. This derivation would include a determination by EPA of the appropriate transuranic waste unit to use for application of the release limits.

Question 6: The Agency is investigating the impacts of gaseous radionuclide releases from radioactive waste disposal systems and whether, in light of these releases, changes to the standards are appropriate. To assist us in this effort, we would appreciate any information pertaining to gaseous release source terms, chemical forms, rates, retardation factors, mitigation techniques and any other relevant technical information.

ACNW View: References two technical reports and recommends relaxation of EPA's release limit for C-14.

NRC Staff View: Advises EPA that information available to the staff has already been made available to EPA.

Combined Comment: Two reports that may be helpful are:

1. W.B. Light, et al., "C-14 Release and Transport from a Nuclear Waste Repository in an Unsaturated Medium," Lawrence Berkeley Laboratory, Report LBL-28923 (June 1990).
2. W.B. Light, et al., "Transport of Gaseous C-14 from a Repository in Unsaturated Rock," Lawrence Berkeley Laboratory, Report LBL-29744 (September 1990).

The "C-14 issue" illustrates the reason for the NRC staff's concern about the technical achievability basis underlying EPA's standards. When EPA originally derived its release limits, gaseous releases of C-14 were not foreseen. Now, it appears that the C-14 release limit of EPA's standards might not be achievable at reasonable cost even though EPA has not shown that exceeding the limit would pose a significant threat to public health or the environment. It is possible that other release modes remain to be discovered which will again require reevaluation of EPA's release limits. Standards based on comparisons with other risks and safety standards, rather than on technical achievability, would not be vulnerable to such surprises in the future.