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MEMORANDUM FOR: R. F. Fraley, Executive Director  
Advisory Committee on Reactor Safeguards

FROM: Robert E. Browning, Director  
Division of Waste Management

SUBJECT: NRC STAFF VIEWS ON IMPLEMENTATION OF THE EPA HLW STANDARDS

Your memorandum of July 29, 1985 to William J. Dircks forwarded the ACRS comments on the EPA standards for disposal of high-level radioactive wastes. I would like to provide you with additional information regarding the staff's views on EPA's standards and on implementation of those standards by the NRC.

The ACRS's concerns are capsulized in the following paragraph from David A. Ward's July 17, 1985 memorandum to Chairman Palladino:

It is our understanding that the NRC Staff has concurred with the proposed EPA standards, including the use of a probabilistic approach on radionuclide release limits. In view of the importance of the ability of the NRC to determine compliance with the EPA standards in licensing a high-level waste repository, we recommend that the Commission assure itself that the NRC Staff is correct in endorsing this approach. We believe that demonstration of such compliance will be extremely difficult and that the proposed standards are unduly restrictive.

The NRC staff recognizes that use of numerical probabilities by EPA represents a novel approach for setting environmental standards. NRC comments on the proposed standards stated "The numerical probabilities in (the proposed standards) would require a degree of precision which is unlikely to be achievable in evaluating a real waste disposal system." In discussions following publication of the proposed standards, the NRC staff explained to EPA the difficulties foreseen in trying to implement a standard containing numerical probabilities. As a result of these discussions, EPA has added a new paragraph to Section 191.13 of the standards which reads as follows:

"Performance assessments need not provide complete assurance that the requirements of 191.13(a) will be met. Because of the long time period involved and the nature of the events and processes of interest, there will inevitably be substantial uncertainties in projecting disposal system performance. Proof of the future performance of a disposal system is not to be had in the ordinary sense of the word in situations that

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deal with much shorter time frames. Instead, what is required is a reasonable expectation, on the basis of the record before the implementing agency, that compliance with 191.13(a) will be achieved."

The staff considers that this wording (which conforms closely to §60.101(a)(2) of the Commission's regulations) sets reasonable bounds on the degree of assurance required for estimates of the likelihood and consequences of potentially disruptive events and processes. The Commission will not need to place sole reliance on probabilistic analyses when evaluating repository safety but, rather, will have considerable opportunity to employ its more traditional analytical and engineering methods. The staff considers that the specific performance objectives of 10 CFR Part 60, the detailed siting and other qualitative criteria of 10 CFR Parts 60 and 960, and the technical positions under development by the NRC staff will help assure that the appropriate balance is struck between use of traditional analytical and engineering methods and probabilistic analyses in making licensing findings. Although the staff continues to believe that the probabilistic nature of the standards will pose a significant challenge, the staff considers that the standards, in the current form, can be implemented in a licensing review.

I hope that this information proves helpful in explaining the staff's views regarding implementation of the EPA standards by the NRC.

Robert E. Browning, Director  
Division of Waste Management

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

October 16, 1985

Honorable Nunzio J. Palladino  
Chairman  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Dear Dr. Palladino:

SUBJECT: ADDITIONAL ACRS COMMENTS ON THE EPA STANDARDS FOR A HIGH-LEVEL  
RADIOACTIVE WASTE REPOSITORY

During its 306th meeting, October 10-12, 1985, the Advisory Committee on Reactor Safeguards met with you and the other Commissioners to offer comments regarding the Environmental Protection Agency (EPA) Standards for a High-Level Radioactive Waste (HLW) Repository, which was the subject of our report to you dated July 17, 1985. In response to the request made during this meeting, we are pleased to submit the following additional comments on the EPA standards which were published as a final rule on September 19, 1985. These standards will apply to the facilities being proposed by the Department of Energy and must be met in the associated licensing review conducted by the NRC.

Our purpose in writing you at this time is to highlight the fact that the standards being promulgated by the EPA are unreasonably restrictive and contain serious deficiencies. This will undoubtedly introduce unnecessary obstacles into the licensing process for an HLW repository, with only minimal benefit to the public health and safety. Our justifications for these comments are outlined below.

Development of these standards has been under way within the EPA since December 1976. During this period, the ACRS and its Subcommittee on waste management were briefed periodically by EPA representatives, and at each such meeting comments and suggestions were discussed on an informal basis. In early 1983 the EPA submitted the then-current draft of the proposed standards to its Science Advisory Board (SAB) for review. Detailed comments by the High-Level Radioactive Waste Disposal Subcommittee of the SAB included the following:

The Subcommittee recommended "that the release limits specified in . . . the proposed standards be increased by a factor of ten, thereby causing a related tenfold relaxation of the proposed societal objective (population risk of cancer)."

The Subcommittee recommended "that use of a quantitative probabilistic condition on the . . . release limits be made dependent on EPA's ability to provide convincing evidence that such a condition is practical to meet and will not lead to serious impediments, legal or otherwise, to the licensing of high-level-waste geologic

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repositories. If such evidence cannot be provided, we recommend that EPA adopt qualitative criteria, such as those suggested by the NRC."

Of particular concern to the SAB Subcommittee, in terms of meeting the conditions of the standards, was the fact that containment requirements should be such that the cumulative releases of radionuclides from a repository to the accessible environment for 10,000 years after disposal, from all significant processes and events that may affect the disposal system, shall:

"have a likelihood of less than one chance in 10 of exceeding" the quantities (given in an accompanying Table); and

"have a likelihood of less than one chance in 1,000 of exceeding ten times" these same quantities.

The SAB Subcommittee also recommended specific changes in the probabilistic aspects of the draft standards to help make it more practical for an applicant to make a case that the quantitative probabilistic criteria had been met.

Although the wording in the standards includes the statement that "performance assessments need not provide complete assurance" that these requirements will be met, there remains the basic fact that the standards, as published, are far too restrictive. In our opinion, the establishment of overly restrictive standards, relieved by leniency in their implementation, is not an appropriate approach. The proper approach would have been to develop reasonable standards that could have been more definitively enforced.

The problems cited above were but a few of those observed and commented upon by the SAB Subcommittee. Additional problems in Working Draft No. 6 of the EPA standards were discussed with an EPA representative during a meeting of the ACRS Subcommittee on waste management on June 18 and 19, 1985. These included the following:

The standards, as published, do not appear to be internally consistent. Although the latest data were used for estimating the biological effects of various radionuclides, the associated dose limits for individual body organs were not based on appropriate risk criteria.

The health risks associated with the release limits specified in the standards are much lower (by factors of a thousand or more) than the risks considered acceptable by the EPA for other environmental stresses, such as hazardous toxic chemicals.

The overly restrictive standards may result in the rejection of some sites proposed for an HLW repository that otherwise might be acceptable.

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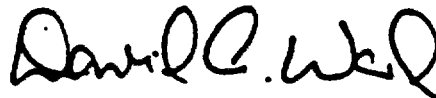
As indicated above, the standards will definitely complicate the processes, both technical and legal, of demonstrating that a given site is acceptable.

We realize that both the NRC Staff and the DOE Staff have accepted the EPA standards. Although we can understand, to some degree, the desires of both staffs to complete this step, we are troubled by the serious deficiencies that exist in the standards. The compromises that have been made at this stage will lead to extended delays and an uncertain outcome in the licensing process for an HLW repository, with only slight benefit to the public health and safety.

Although the ACRS could undertake a more detailed review and critique of the EPA standards, we believe that the SAB Subcommittee has already done this in a professional manner. A copy of the Executive Summary of their report is attached for your information.

We hope this letter is helpful. Although we realize that the EPA standards have been published, we believe that they contain such serious deficiencies that the NRC should take prompt action to voice these concerns.

Sincerely,



David A. Ward  
Chairman

**Attachment:**

Section II, "Executive Summary" of Report on the review of Proposed Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes (40 CFR 191) by the SAB, EPA, dated January 1984

**References:**

1. Letter from Herman E. Collier, Jr., Chairman, EPA High-Level Radioactive Waste Disposal Subcommittee, to Mr. William D. Ruckelshaus, Administrator, EPA, dated February 17, 1984 transmitting Report on the review of Proposed Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes by the High-Level Radioactive Waste Disposal Subcommittee, Science Advisory Board, EPA, dated January 1984
2. SECY-84-320, "NRC Staff Comments to EPA on the SAB Report on Proposed EPA Standard for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Waste (40 CFR Part 191)," dated August 9, 1984, including Working Draft No. 8, Final 40 CFR 191, Subchapter F - Radiation Protection Programs, dated July 19, 1985

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3. SECY-85-272, "Report on the EPA's Environmental Standards for High-Level Radioactive Waste Disposal," dated August 13, 1985
4. Memorandum from R. E. Browning, Director, Division of Waste Management, to R. F. Fraley, ACRS, Subject: NRC Staff Views on Implementation of the EPA HLW Standards, dated September 11, 1985

**NRC STAFF VIEWS  
REGARDING THE FINAL  
EPA HIGH-LEVEL WASTE STANDARDS  
OCTOBER 21, 1985**



### **EPA HIGH-LEVEL WASTE STANDARDS ISSUES**

- ARE THE EPA STANDARDS OVERLY CONSERVATIVE, ESPECIALLY COMPARED WITH STANDARDS IN OTHER AREAS?
- CAN THE PROBABILISTIC FEATURES OF THE STANDARDS BE IMPLEMENTED IN A FORMAL LICENSING REVIEW?

**SUMMARY**

- NRC WAS INTENSELY INVOLVED FOR NINE YEARS IN REVIEWING THE DEVELOPMENT OF THE EPA HIGH-LEVEL WASTE STANDARDS.
- INDEPENDENT NRC STUDIES HAVE SHOWN THE STANDARDS TO BE ACHIEVABLE.
- EPA SIGNIFICANTLY MODIFIED THE STANDARDS TO ALLOW QUALITATIVE JUDGMENTS IN LICENSING REVIEWS.
- AS NOTED IN SECY-85-272, EPA HAS BEEN RESPONSIVE TO NRC'S CONCERNS REGARDING THE ABILITY TO IMPLEMENT THE STANDARDS.
- SINCE SECY-85-272, NO NEW ISSUES HAVE ARISEN WHICH WOULD ALTER THE CONCLUSIONS OF THAT PAPER.

# WHO HAS REVIEWED THE STANDARDS

NRC -- REVIEWED THROUGHOUT EPA'S DEVELOPMENT. COMMISSION REVIEWED AND REVISED STAFF COMMENTS ON PROPOSED STANDARDS.

DOE -- INTERACTED WITH EPA, PARALLEL TO THE NRC'S REVIEWS.

STATES AND TRIBES -- INTENSE SCRUTINY FOLLOWING PUBLICATION OF PROPOSED STANDARDS.

OMB -- SIGNIFICANT SCRUTINY OF THE PROPOSED STANDARDS PRIOR TO PUBLICATION. LESS INVOLVEMENT PRIOR TO FINAL PUBLICATION.

EPA SCIENCE ADVISORY BOARD -- SUBCOMMITTEE WAS FORMED TO REVIEW PROPOSED STANDARDS. SAB REPORT REVIEWED BY NRC STAFF, AND COMMENTS FORWARDED TO COMMISSION (SECY-84-320).

ACRS -- ACRS AND ITS WASTE MANAGEMENT SUBCOMMITTEE PERIODICALLY BRIEFED ON STANDARDS.

## **BASES FOR NRC STAFF POSITIONS**

### **CONSERVATISM**

- EPA HAS LEGAL RESPONSIBILITY TO DETERMINE ALLOWABLE LEVEL OF HEALTH EFFECTS.
- NRC STAFF CONSIDERS STANDARDS TO BE ACHIEVABLE BASED ON NUREG/CR-3235.
- STANDARDS CAN BE VIEWED AS A QUANTIFICATION OF "AS LOW AS REASONABLY ACHIEVABLE," GIVEN CURRENT UNCERTAINTIES.

### **PROBABILISTIC FEATURES**

- NRC STAFF PROPOSED WORDING TO PERMIT QUALITATIVE LICENSING FINDINGS WHERE NECESSARY. EPA INCORPORATED WORDING IN STANDARDS. WORDING IS NOT VIEWED AS COMPENSATION FOR EXCESS CONSERVATISM IN THE STANDARDS.
- EPA RULE CONFORMS TO COMMISSION'S DISTINCTION BETWEEN QUANTITATIVE PERFORMANCE STANDARDS AND QUALITATIVE STATEMENTS REGARDING LEVELS OF CONFIDENCE (48 FR 28204).