



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

September 6, 1990

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

Dear Chairman Carr:

SUBJECT: REVISION 1 OF DRAFT TECHNICAL POSITION ON WASTE FORM

During its 23rd meeting on August 29 and 30, 1990, the Advisory Committee on Nuclear Waste (ACNW) reviewed a draft version of Revision 1 of the Technical Position on Waste Form, prepared by NRC's Division of Low-Level Waste Management and Decommissioning. The Committee also had the benefit of discussion with the NRC staff on this matter.

The revision represents a significant expansion of the previous document on this same subject and reflects many of the points that were called to the attention of the NRC staff during previous ACNW and ACRS subcommittee meetings. Owing to the importance to public health and safety that is now properly attached to the quality of the low-level waste form, we conclude that this technical position, when fully implemented, can serve as a useful guide in the evaluation of waste forms used in low-level waste disposal. We believe that the required reporting of mishaps will be especially useful.

Listed below are several concerns that the Committee has on this subject. However, we believe that publication of the Technical Position need not be held up pending resolution of these concerns. To assist in their resolution, we recommend that the NRC staff consider the detailed discussions held during the ACNW meeting of August 29, 1990.

1. The applicable regulation (10 CFR Part 61) places emphasis on the physical stability of the waste form (Class B and Class C) with the intent that by this means access of water to the waste can be controlled. There is no requirement in Part 61 for a specified resistance of the waste form to leaching of radionuclides by ground water. We believe that an important attribute of the waste form is its behavior related to migration of radionuclides into the environment. We believe a revision of Part 61 addressing this point is needed, but

until that is completed, the Technical Position should be amended to reflect more directly the attention that leaching resistance should be given. The almost exclusive focus of the Technical Position on mechanical integrity of the waste form and the effect of various phenomena (e.g., thermal cycling, radiation, and immersion in water) on that integrity should be supplemented by requirements that leach resistance, as measured by a specified separate test, should be maintained in parallel with mechanical strength after the waste is subjected to these phenomena.

2. The testing requirements cited in the revised Technical Position should be representative of conditions likely to be encountered in a shallow land burial site. The primary mobilizing agent is ground water which could be more aggressive in enhancing movement of radionuclides than the distilled water or synthetic sea water now specified in the Technical Position. We believe that the specific test conditions cited in the Technical Position, now oriented only to structural impact, should be complemented by additional conditions that relate to the ground water chemistry of the waste. Further, biodegradation tests should be specified for cementitious waste matrices using bacteria that are likely to affect cement as well as the organic component of the waste.
3. We believe that the provisions for tests of the radiation resistance of waste forms may not be sufficiently conservative when considering the potential for hydrogen generation in closed spaces. The NRC staff is urged to reexamine this topic to ensure that slow buildup of hydrogen from water-bearing wastes in sealed containers does not become a problem for long-term, safe disposal.
4. We believe that insufficient attention has been given to the testing of aged waste forms. Many of the matrices, including concrete, that are used to contain wastes continue to change chemically and physically long after their preparation. Owing to the longer term focus (i.e., 300 years) of the waste integrity requirement, definition of the behavior of waste specimens that simulate aged waste forms appears appropriate for inclusion in the Technical Position where such testing appears feasible and reasonably reliable.
5. The Committee notes that a part of the regulatory control over low-level waste disposal is based on Part 20 regulations (10 CFR 20.311). We urge that the NRC staff examine the revisions in Part 20 that affect low-level waste and ensure that the Technical Position and the updated Part 20 are compatible.
6. The Committee is aware that the newly developed criteria for compressive strength of acceptable cementitious waste forms

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[500 psi] lacks strong technical justification but was selected to preclude the use of unstable waste forms. The NRC staff should include in the Technical Position recognition that the compressive strength that is initially called for may not be retained by the waste form for its required life. Long-term degradation of compressive strength to lower levels, but not less than the approximately 60 psi required for other waste forms, may be acceptable.

We hope you will find these comments useful.

Sincerely,



Dade W. Moeller
Chairman

Reference:

U.S. Nuclear Regulatory Commission Draft Technical Position on Waste Form (Revision 1) dated June 1990, Prepared by Technical Branch, Division of Low-Level Waste Management and Decommissioning (Predecisional)

