



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

ACNWR-0096

PDR

June 3, 1994

The Honorable Ivan Selin
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Selin:

**SUBJECT: REVIEW OF THE LOW-LEVEL RADIOACTIVE WASTE PERFORMANCE
ASSESSMENT PROGRAM**

The Advisory Committee on Nuclear Waste (ACNW) has developed and operates under a program plan which includes both identification and selection of issues pertinent to nuclear waste management and determination of priorities for the ACNW schedule of activities. Low-Level Radioactive Waste (LLW) Performance Assessment (PA) is specifically identified in the program plan for study by the Committee. This topic is addressed in terms of the activities and capability of the NRC staff and the relation to programs dealing with LLW. These considerations satisfy the Committee criteria for topic selection and prioritization.

The purpose of this letter is: (1) to provide to the Commission the results of the ACNW review of the NRC staff LLW PA program and (2) to provide comments to the Commission regarding the utility, focus and adequacy of the Draft Branch Technical Position (BTP) on PA applied to LLW disposal. These evaluations are based on presentations by the NRC staff during the ACNW Working Group meeting held on March 22, 1994, and on discussions during the 62nd, 63rd, and 64th meetings of the Committee on March 24, 1994, April 21, 1994, and May 17-18, 1994, respectively.

A. Capability of the NRC Staff PA Program Applied to LLW Facilities

1. The Committee concluded that the NRC staff has a sound and functional understanding of the bases of comprehensive PAs. Further, it was apparent that the NRC staff members making the presentations were knowledgeable in their fields of specialty. The NRC staff appears to have the necessary resources (personnel, computer hardware and software, etc.) to carry out these assessments. The recent consolidation of the LLW and the High-Level Radioactive Waste (HLW) PA staffs should enhance these capabilities as long as the identity and continuity of experience of these teams are preserved.

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2. The Committee recommends that the NRC staff seek ways to demonstrate that the PA results it obtains are in agreement with actual data obtained from sites which are sufficiently similar to those encountered in LLW disposal, to establish functional credibility of the NRC PA process and gain additional experience. Such a demonstration would lend additional credence to the presumption that the staff has the appropriate capability. Although such data are difficult to obtain, the benefits from such a demonstration are worthy of a significant effort.
3. The NRC staff is urged to develop a rational basis for the scope and depth of its required capability in performance assessment. Such a position should be submitted to the Commission for review and discussion. The capability requirements are different, depending on the role the staff may take. Clearly, the thrust should be the ability to review a PA for credibility and completeness.
4. The Committee believes that risk calculations from PA should be made using, to the extent feasible, dose models that are applied elsewhere in the NRC for such purposes. The presentations by the NRC staff indicated no such consistency.
5. The Committee agrees with, and strongly supports, the proposed use of probabilistic techniques in the PA process. These techniques are essential to capture uncertainty, to clearly delineate the current state of knowledge, and to serve as a guide to the acquisition of additional data.

B. Branch Technical Position

1. The revised draft BTP represents a significant improvement over the previous version, and the NRC staff should be commended for this effort.
2. The general approach to PA, as described in the BTP, reflects contemporary methods of analysis including the scenario based approach to risk assessment and the treatment of uncertainties.
3. The individual activities of PA are well articulated with respect to such areas as radionuclide transport, engineered barrier performance, source term definition, and dose assessment.
4. The draft BTP should be reviewed and, where necessary, revised to ensure that it is a generic document applicable to a variety of LLW disposal facility types. The draft version forwarded to the Committee for review requires

significant editing to remove prescriptive sections that are either arbitrarily devised or are based on predetermined, but not evident, concepts of an LLW disposal facility. The Committee believes that the bases for excluding from the BTP above-ground vaults and facilities deeper than 30m should be explicitly stated, and alternative sources of guidance to the reader need to be provided in a timely manner if these facilities are not discussed in this BTP.

5. We agree with the NRC staff's stated position that PA should adopt a "successive approximation" or "phased" or "iterative" approach. We were disappointed not to see this position more clearly visible in the document. Although the NRC staff alluded to starting PA during the early stages of an LLW disposal facility, this approach was not specifically noted. The Committee favors early application of PA as a means of measuring project progress with each iteration of the assessment and believes this should be reflected in the BTP.
6. The Committee believes that there is significant uncertainty about the required time frame for PA. The presently used arbitrary numerical values (e.g., 10,000y) lack bases in either standards or regulations. The Committee recommends that, as a minimum, the time frame for site-specific PA should be guided by the dose-time profile as depicted in the draft BTP and used in conjunction with an explicit upper time limit. The NRC staff is urged to develop a position on the appropriate time frame and submit it to the Commission for discussion, review, and approval.
7. The Committee believes that the process for elicitation of expert judgment in conjunction with the construction of a PA data base needs to be specified. The NRC staff recognizes the value of expert judgment but does not identify in the BTP specific acceptable processes of expert solicitation. More guidance for the reader of the BTP is needed on the process of transforming expert judgment into a form that is suitable for inclusion in the PA data base.
8. The Committee recommends that in those cases where the BTP describes PA results that have the benefit of uncertainty analyses, the performance indicators be presented accordingly to reflect the full state of knowledge of the results. Specifically, probability distribution functions should be presented rather than simply measurements of the central tendency of the results such as the mean or the median.

The Honorable Ivan Selin

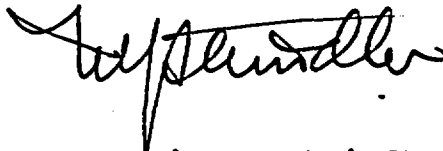
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9. The draft BTP lists specific issues that are not to be included in the PA (e.g., global climate change) but fails to identify the criteria used to exclude these issues. The Committee recommends that such criteria rather than prescriptive specifics be provided to the reader.

We trust these comments and recommendations will be useful.

Sincerely,



Martin J. Steindler
Chairman

Reference:

U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, Draft Branch Technical Position on Performance Assessment for Low-Level Waste Disposal Facilities, January 1994