



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

FORM NRC-0004

May 1, 1990

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

Dear Chairman Carr:

SUBJECT: CRITIQUE OF THE ENVIRONMENTAL PROTECTION AGENCY'S
STANDARDS FOR DISPOSAL OF HIGH-LEVEL WASTES

In response to your request during our meeting on February 21, 1990, the Advisory Committee on Nuclear Waste offers the following comments on the problems we see with the EPA standards (Ref. 1) for the disposal of high-level wastes. These comments are an outgrowth of our ongoing review of these standards, including a full-day session on this matter during our 18th meeting, March 22-23, 1990, and additional discussions during our 19th meeting, April 26-27, 1990. Organizations whose representatives took part in the discussions during our 18th meeting included the Environmental Protection Agency, the Nuclear Waste Technical Review Board, the staff of the Board on Radioactive Waste Management of the National Academy of Sciences, the Environmental Evaluation Group of the State of New Mexico, the Advisory Committee on Nuclear Facility Safety of the U.S. Department of Energy, and the General Accounting Office. Members of the NRC staff also attended these meetings.

Key technical problems with the EPA standards include the following:

1. All such standards should be organized in a hierarchical structure with the higher levels expressing the objectives in a qualitative sense and the lower levels stating the objectives quantitatively. Of utmost importance is that the several levels be consistent and that lower levels not be more stringent or conservative than the higher levels, so that they become de facto new standards. This is not the case with the EPA standards.

2. Although lower level standards can be stated probabilistically, they should be expressed in terms of annual risk limits from a disposal facility in an undisturbed and a disturbed state. The critical population group being considered should be clearly defined. This approach is in accord with recommendations of organizations such as the International Commission on Radiological Protection and the United Kingdom's National Radiological Protection Board.
3. The standards should apply to the disposal facility as a system. Subsystem standards, if expressed, should be given only as guidance, with qualifying statements clearly specifying that they are not to be applied in a regulatory sense.
4. Evaluations of the anticipated performance of the proposed Waste Isolation Pilot Plant indicate that, for the disturbed state, human intrusion is the dominant contributor to risk. Early indications suggested that performance analyses for the proposed Yucca Mountain repository may also show human intrusion to be important. This appears to be a direct result of how the standards for evaluating such intrusions are interpreted, compounded by the overly conservative requirements of the standards. To ameliorate this issue, we suggest that the standards be rewritten to separate the evaluations of anticipated performance into three parts: (a) the undisturbed repository; (b) the disturbed repository, exclusive of human intrusion; and (c) the repository as it might be affected by human intrusion. This would clearly separate out the problem of human intrusion and permit it to be addressed directly. In this regard, we join with the Advisory Committee on Nuclear Facility Safety, U.S. Department of Energy, in recommending that EPA's standards be reworded to permit "considerations such as expectations for future borehole sealing at least as good as the current state-of-the-art." We also believe that more realistic assessments should be made of the potential impacts of human intrusions and that greater credit should be allocated to the ability of future generations to be aware of the presence of a geologic repository through identifying markers and associated records.
5. Experience has shown that probabilistic risk analyses cannot be used reliably to determine the compliance of a single nuclear power plant with a set of standards. A high-level waste repository, which must function for 10,000 years, is still more difficult to assess quantitatively. The EPA standards should clearly specify that risk assessments are but one of several inputs into the evaluation of a given high-level waste repository site and/or facility. Such assessments should not be the only factor in evaluating compliance of such a facility with the EPA standards.

In summary, our key recommendations are:

1. The existing EPA standards need to be revised; now is the time to accomplish this task;
2. The standards should be revised to define what is considered to be an acceptable risk from a high-level waste repository;
3. The standards should specify that a probabilistic approach is acceptable so long as it is but one of several factors to be used in determining the acceptability of a specific site; and
4. The standards should be revised to include separate considerations for evaluating the impacts of human intrusion.

We stand ready to join you and the NRC staff in working with EPA to help develop an acceptable set of standards for a high-level radioactive waste repository. We believe this is the best course of action at the present time. If, however, after a reasonable period of time these efforts do not appear to be accomplishing our mutual goals, we believe other approaches should be considered. One would be for you, as Chairman of the NRC (perhaps joining with the Secretary of DOE) to approach the EPA Administrator with a suggestion that an appropriate organization be selected to review the standards and make recommendations for change. Suggestions for two such organizations are the National Academy of Sciences and the Council on Environmental Quality.

We hope that these comments are helpful. We will be pleased to discuss these matters with you at your convenience.

Sincerely,



Dade W. Moeller
Chairman

References:

1. U.S. Environmental Protection Agency, "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes," (40 CFR Part 191), Working Draft 2, dated January 31, 1990

2. Letter dated April 17, 1990 from F. L. Galpin, Environmental Protection Agency to Dade W. Moeller
3. Letter dated December 11, 1989 from John F. Ahearne, Advisory Committee on Nuclear Facility Safety, DOE, to James D. Watkins, Secretary of Energy, DOE
4. Sandia National Laboratories, SAND89-2027, "Performance Assessment Methodology Demonstration. Methodology Development for Evaluating Compliance With EPA 40 CFR 191, Subpart B, for the Waste Isolation Pilot Plant," Printed December 1989
5. International Commission on Radiological Protection, ICRP Publication 46, "Radiation Protection Principles for the Disposal of Solid Radioactive Waste," published for the International Commission on Radiological Protection by Pergamon Press, Oxford, England, July 1985
6. National Radiological Protection Board, NRPB-GS 1, "Radiological Protection Objectives for the Disposal of Solid Radioactive Wastes," published in Oxfordshire, England, 1983