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GEOLOGICAL SURVEY
RESTON, VA. 22092

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Mr. Samuel J. Chilk, Secretary
Office of the Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Chilk:

This letter is in response to the Federal Register notice (Vol. 44, No. 36, dated December 6, 1979) inviting public comment on a proposed rule for licensing the receipt and disposal of high-level radioactive wastes (HLW) at geologic repositories (10 CFR Part 40 Subparts A-D). The staff of the U.S. Geological Survey (USGS) has reviewed those parts of the rule involving earth-science issues.

In general, the USGS endorses the procedures set forth in the proposed rule. They have been formulated to take account of the fact that disposal of radioactive waste in mined repositories requires new technology that must be developed in a stepwise, conservative manner. Each major step in the licensing provides opportunities for reevaluation of previous analyses and judgments; State and local officials and the general public will be involved in these reevaluations.

A major issue in the regulatory philosophy under development is the proposed requirement to characterize a number of sites in appropriate media by in situ tests at depth before selection of the repository site and issuance of a license to construct. The USGS supports these requirements. The enclosed comments offer more specific technical justifications for our endorsement of the proposed in situ testing requirements, together with some suggestions on technical approaches.

Sincerely yours,

H. William Menard
Director

Enclosure

Acknowledged by card. 3-14-80

Comments by U.S. Geological Survey (USGS) on a Proposed Rule for Licensing the Receipt and Disposal of High-Level Radioactive Wastes (HLW) at Geologic Repositories

Although the U.S. Department of Energy had been planning to conduct in situ tests early in the construction of any repository, the USGS feels it is useful to require collection of such data at a number of sites prior to full adjudicatory hearings of the licensing process. Those hearings can then proceed on the basis of critical, site-specific data on the candidate host rocks and their environs rather than on inferences derived from a limited number of drill holes supplemented by remote geophysical techniques. Characterization of geologic media is a particularly difficult problem in geotechnical engineering because of the ever-present possibility of lateral changes in the properties of host rocks and the possible presence of inhomogeneities too small to detect by remote or borehole techniques. Direct observation and in situ tests of host media will be the only way to characterize sites with confidence. Tests that should be conducted at or near the repository horizon include: thermomechanical and coupled thermomechanical-thermohydrologic response of the host rock and adjacent formations; hydrologic properties of the host rock and adjacent formations; tests for emplacing, monitoring, and retrieving waste packages; tests of possible interactions between the waste canisters and the rock fluid; and field tests of geochemical reactions which retard radionuclide migration both in the near- and far-fields.

At this point, a statement of caution is necessary. The Commission will have to have clearly defined objectives for these tests so that they are not required to continue for unduly long periods and do not damage the potential isolation characteristics of the host rock. For the first repository, a conservative strategy would be to substantially limit the thermal load and maximum temperatures in the repository. Thermal tests of repository design could therefore be conducted at relatively low temperatures. Some limited higher temperature tests might be useful to set limits on model parameters.

In order to make a meaningful comparison of a number of potential repository sites in a variety of different geological environments, as required by the President's comprehensive waste management plan of February 12, 1980, in situ tests at repository depths will be necessary at four to five sites. Although costly and time-consuming, such characterization at four to five sites will be necessary for a valid consideration of alternatives under the National Environmental Policy Act. The costs of such characterization will certainly not represent wasted funds. If characterization shows that an initially promising site is in fact not suitable, much of value will be learned. If characterization shows a site to be suitable, it can be reserved for later use as a repository if it is not selected for the first.

Although not strictly an earth-science matter, we note in passing that the proposed regulations do not consider possible interfaces with existing regulations governing Federal lands, specifically the Federal Land Policy and Management Act of 1976.

U.S. Geological Survey
February 26, 1980