

October 28, 1985



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Honorable Lee M. Thomas
Administrator
U.S. Environmental Protection Agency
401 M St. S.W.
Washington, D.C. 20460

OFFICE OF
THE ADMINISTRATOR

Dear Mr. Thomas:

The Radiation Advisory Committee of the Science Advisory Board has completed its review of the March 13, 1985 draft Background Information Document to accompany the Agency's proposed standards on low-level radioactive waste disposal. At the request of the Agency's Office of Radiation Programs, the Committee addressed eleven issues associated with the draft document. These include: 1) sorption characteristics and environmental behavior of carbon-14; 2) behavior of carbon-14 and tritium in the disposal trench; 3) the reasonableness of time spans for risk assessment; 4) identification of disposal pathways from disposal of low-level wastes; 5) exposure pathways from unregulated disposal of "below regulatory concern" wastes; 6) generic characterization of disposal sites; 7) appropriateness of site-independent modeling parameters; 8) appropriateness of model scale and approach; 9) parameters investigated in sensitivity analysis; 10) uncertainty in risk assessments; and 11) adequacy of the range of low-level waste disposal methods.

The Radiation Advisory Committee believes that the Background Information Document, on the whole, provides a reasonable presentation of the potential sources and risks associated with the disposal of low-level radioactive wastes. There are, however, deficiencies in parts of the document. To remedy these the Committee has suggested extensive revisions, which should be made before publication of the Background Information Document.

The Committee's major findings, stated below, are of most immediate concern to you. Specific technical comments of no lesser importance are attached to this transmittal letter.

Major Findings

1) The purpose of the Background Information Document and the methodologies presented should be more clearly stated in the introductory pages. There should be a full explanation of how the Agency will use the information to arrive at and support a generally applicable radiation protection standard for the disposal of low-level radioactive wastes. The Background Information Document itself is only one of the elements that enters into the setting of proposed standards.

2) Risk assessment involves the use of a variety of complex models. These are predicated on the legitimacy of certain assumptions and the appropriateness of the data that are utilized. It is important that the uncertainties in these data and calculational procedures be fully described at the outset.

3) The Committee believes that the spans of time over which the analyses are made, 1,000 and 10,000 years, are unrealistically long. The Committee finds the assumptions that social change, advances in public health, and population growth will not occur over a 10,000 year period unpersuasive. The Office of Radiation Programs should select a time frame based either on explicit engineering considerations, biological reasonableness, or (preferably) both.

4) The Committee is concerned about the manner of presentation of the results of the risk assessment. First, it urges the use of International Standard Units (SI) wherever practicable and a clearer, more consistent use of terms such as dose and dose rate. Second, we suggest using absolute risk for those cancers where it is most appropriate, such as leukemia and osteosarcomas, and relative risk for the remainder, rather than an average of the two projections. Third, the risk should be couched in terms of risk to an individual (or 1,000, 10,000, individuals) and not in terms of numbers of deaths and genetic effects within populations of dissimilar size and demographic characteristics. Fourth, the risk projections, though ostensibly state-of-the-art, are not always so. The Committee has noted several such instances in its detailed comments on the Background Information Document. Finally, the section on teratogenesis, and more specifically mental retardation, needs extensive revision if it is to reflect present knowledge in an objective manner. Although these changes are complex and time-consuming, they are, in the Committee's view, worthwhile.

5) The Committee identifies some technical weaknesses that could be remedied by better use of existing information, and it presents some areas of additional needed research. Without suggesting that these latter needs must be remedied before a standard can be issued, the Committee lists below some of the areas in which research is strongly recommended:

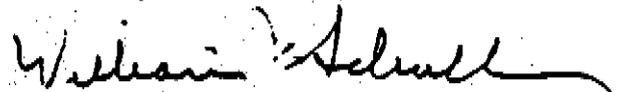
a) Research is needed to improved our understanding of the geohydrology of long-lived, mobile radionuclides. Tritium, carbon-14, technetium-99, iodine-129, and neptunium-237 should be given particular attention. These studies should include an evaluation of the transport of various chemical forms in a variety of soil types.

b) The behavior of long-lived mobile radionuclides in the disposal trench is not well understood. Research should be supported to determine specific leach rates for these radionuclides in their various physical and chemical forms. These differences would affect the rate of movement of radiocarbon from the site and the time at which the maximum exposure rate occurs after closure.

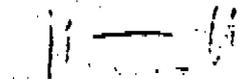
c) The Committee recommends that the Agency support and encourage research in technical areas where major uncertainty exists. In addition, future research on the biological effects of radiation should include particularly the assessment of human studies on low dose risk estimation and the evaluation of dose response information and relative biological effectiveness (RBE) from human and other biological systems.

We believe that the Background Information Document with the recommended changes should prove useful to you, other Agency officials, and the general public in promoting a wider understanding of the options for the disposal of low-level radioactive wastes. The Board appreciates the opportunity to present its views and stands ready to provide any additional assistance that the Agency needs. We request that the Agency respond to our report, indicating which of our recommended changes the Office of Radiation Programs plans to make and, where our recommendations are not accepted, giving the reasons for not accepting those recommendations.

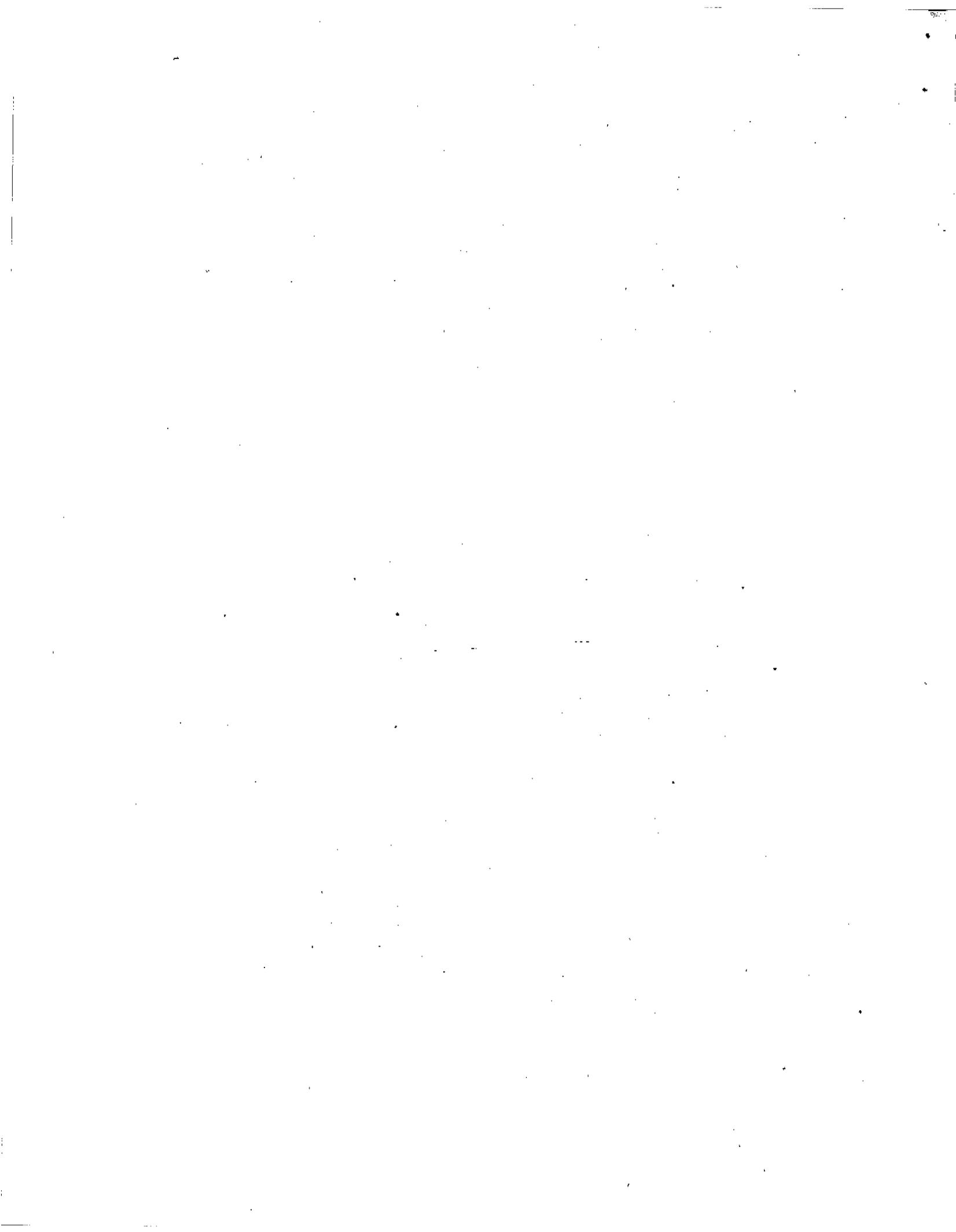
Sincerely,



William J. Schull
Chair, Radiation Advisory Committee



Norton Nelson
Chair, Science Advisory Board



REPORT

on the

March 13, 1985

DRAFT BACKGROUND INFORMATION DOCUMENT

for

PROPOSED LOW-LEVEL RADIOACTIVE WASTE STANDARDS

by the

RADIATION ADVISORY COMMITTEE

SCIENCE ADVISORY BOARD

October 1985

