



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

SAB-RAC-88-041

September 9, 1988

OFFICE OF
THE ADMINISTRATOR

Honorable Lee M. Thomas
Administrator
U. S. Environmental Protection Agency
401 M Street SW
Washington, DC 20460

Dear Mr. Thomas:

The Dose and Risk Subcommittee of the Science Advisory Board's Radiation Advisory Committee has completed its review of the Office of Radiation Programs' Low-LET Risk Estimate for Regulatory Purposes. This review was requested on February 25, 1988 by the Director of the Office of Radiation Programs and was conducted on June 20, 1988, at an open meeting in Washington, DC, at which Dr. Douglas Chambers of SENES Consultants and Dr. Leonard Hamilton of Brookhaven National Laboratory presented public comment. Because the Office of Radiation Programs is considering using its new estimate of risk as part of the technical basis for the revised radionuclides NESHAP, the Science Advisory Board was asked to respond as early as possible.

The 1980 report of the National Academy of Sciences Committee on the Biological Effects of Ionizing Radiation (BEIR-III), for a linear-quadratic dose-response model and the absolute as well as the relative risk projection models, estimated a range of 77 to 226 additional fatal cancers in a population of one million individuals exposed to a single, whole-body absorbed dose of 1 rad of low-LET radiation (see page 209 of the BEIR-III Report). The lower value corresponds to the absolute risk projection model, and the higher one, the relative risk projection model, currently thought to be the most generally appropriate method for predicting lifetime radiation risks to a population. For a linear dose-response model and a relative risk projection, the Committee estimated about 400 fatal cancers. BEIR-III attributes risk to individual organs by a mixture of methods, the specific one in a given instance depending upon the organ in question. Although published in 1980 and based on data through 1974, this report still represents the most current national technical consensus on low-LET radiation risks.

Several important reports on radiation risks are expected within the next year which could alter our perceptions of their magnitude. Based, in part, on new information from Japan on the survivors of the atomic bombing of Hiroshima and Nagasaki, and representing months of work and debate by distinguished panels of internationally recognized scientists, these reports will undoubtedly advance significantly the scientific understanding of the cancer risk presented by low-LET radiation. These technical consensus documents include a report of the National Academy of Sciences' Committee on the Biological Effects of Ionizing Radiation (BEIR-V), a report of the United Nation's Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), and reports of the International Commission on Radiological Protection (ICRP) and the National Council on Radiation Protection and Measurements (NCRP). The Subcommittee urges the Environmental Protection Agency to take the findings and conclusions of such reports into account in the development of final regulations on radionuclides in the environment.

Generally speaking, the Subcommittee believes the effect of the new information and new analyses will be to raise the level of risk understood to be associated with low-LET radiation exposure. The sources of this change are: the recalculation of doses for individuals exposed to the atomic bombs in Japan which shows the doses to have been generally lower than previously thought, and the risks correspondingly higher; increased follow-up, particularly among those who were children at the time of the bombing, which has detected more cancer cases; and changes in the statistical models used to predict lifetime risk from the absolute or additive projection model to the currently more widely accepted relative or multiplicative projection method. The technical consensus evaluations of the new information from Japan and its implications for radiation risks which will be available in the near future will provide the Agency a much sounder basis for estimating risks from low-LET radiation. Under these circumstances, we do not believe that an intensive Agency effort this summer to create an interim model for low-LET radiation risks is likely to be of lasting value to the Agency.

The Office of Radiation Programs', recognizing many of the above changes, has now proposed, based on the BEIR-III linear relative risk model, a nominal central estimate of 400 fatal cancers and a range of 120-1200 additional fatal cancers per million persons exposed to one rad of low-LET radiation. The risk to individual organs are essentially those given in BEIR-III prorated over the new range.

For the interim, until the reports alluded to above become available, the Subcommittee finds acceptable the Agency's proposed central estimate, and range.

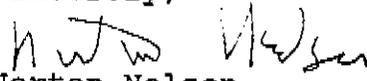
The Subcommittee recognizes that techniques to evaluate the uncertainty inherent in risk projections lag behind understanding of their importance. It must be borne in mind, however, that these uncertainty estimates address only the uncertainties in the existing human data and models, and not those in estimating environmental sources, transport and future human exposures.

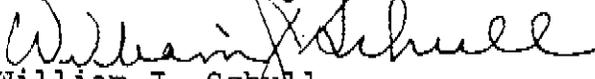
In summary, the Dose and Risk Subcommittee advises the Agency to rely on the model in the BEIR-III report, suitably scaled up to the proposed interim values, during the brief period until the national and international technical consensus documents become available within the next six to twelve months. This should allow the Agency to incorporate the scientific community's best understanding of the risks presented by low-LET radiation in its Background Information Document and final regulations.

The Subcommittee looks forward to the opportunity to review the Background Information Document on which the final regulations will be based.

We appreciated the opportunity to share our views with you and look forward to a written response from the Agency.

Sincerely,


Norton Nelson
Chairman, Executive Committee
Science Advisory Board


William J. Schull
Chairman, Radiation Advisory Committee
and Dose and Risk Subcommittee

Attachment: Roster

cc: R. Guimond
J. Cotruvo