Health Physicists Debate Committed Dose In Radiation Safety Standards

Based on a misinterpretation of radiation dose limits established by the International Commission on Radiological Protection (ICRP), proposed federal guidance in the United States may inadvertently allow radiation workers to receive exposures up to 50 times the ICRP limits, according to some health physicists.

"The ICRP [Publication] 2 limit for the whole body of '5 rems in a year' and the limit for those organs not specifically singled out of '15 rems in a year' when associated with internal radiation actually referred to 50-year committed dose limits due to the intake of a radionuclide in a year, and not to annual dose limits," said Kenneth W. Skrable, PhD, a health physicist in the radiological sciences program at the University of Lowell in Massachusetts (*1*).

"False impressions"

This wording in the ICRP Publication 2, published in 1960, "gives the false impression that the actual annual doses had to be controlled to particular sacrosanct limits. It also gives the false impression that internal exposures can be considered to be adequately under control provided that these annual sacrosanct limits are never exceeded," said Dr. Skrable.

From 1960 to 1975, workers at commercially licensed facilities and at government facilities had their exposures controlled and evaluated by a system which followed the ICRP's committed dose recommendations.

In 1975, government workers had their exposures controlled by a new system, introduced by the Energy Research and Development Administration (ERDA) which later became the U.S. Department of Energy (DOE), of evaluating intake of radionuclide in terms of an annual rather than a committed dose.

Double standard

In addition to establishing two sets of safety standards for U.S. radiation workers, the revised system for DOE employees "allows an exposure as large as 200 times the current quarterly exposure limit specified in 10 CFR 20 for workers at commercial facilities," Dr. Skrable told *Newsline*.

According to Francis X. Masse, director of radiation protection at the Massachusetts Institute of Technology, however, "operational history, in fact, indicates that long-term committed dose has always been considered in controlling the intake of long-lived radionuclides."

When the U.S. Environmental Protection Agency (EPA) began drafting its revision of Radiation Protection Guidelines to Federal Agencies for Occupational Exposure (see p. 976), the issue provided a catalyst for the Health Physics Society (HPS), to form its Ad Hoc Committee on Occupational Radiation Exposure.

The proposed drafts for the EPA guidelines recommend and/or require the control of exposures within the current ICRP committed dose limits. "Exceptions and modifications of these limits, however, are used in cases involving exposures to radionuclides having long effective half-lives," explained Dr. Skrable, who was the first chairman of the HPS's ad hoc committee.

The major debate within the HPS occurred over the concept of *recording* internal radiation dose. The HPS committee recommended that the intake of radioactive materials be controlled based on the estimate of the 50-year committed dose, but that exposure records accurately reflect only doses that have been received, explained Mr. Masse.

Some health physicists, however, still believe that regulations should incorporate the ICRP committed dose recommendations for both the control and evaluation of internal radiation exposures(*2*).

Mr. Masse, the most recent chairman of the HPS's ad hoc committee, explained why it disagreed with the ICRP system. "The difficulty in direct measurement of body depositions and changes for long-lived, well-retained radionuclides is such that order-of- magnitude errors are possible." (*3*)

Recording committed doses of workers would not provide "an accurate reflection of true dose history. Casual documentation of committed dose estimates, with no follow-up assessment, is a disservice to radiation workers," said Mr. Masse.

A resolution, calling for the HPS to confirm its support of the ICRP committed dose limits for internal radiation protection and control, was presented to HPS members for a vote on ballots mailed last month.

References

1. Skrable KW, et al: The issue concerning the use of an annual as opposed to a committed dose limit for internal radiation protection. *J Soc Radiol Prot* 5:1:7-14, 1985

2. Skrable KW, et al: The use of an annual as opposed to a committed dose limit for internal radiation protection, Parts I-III. *Health Phys Soc Newsletter* XII:6:1-4, XII:7:1-4, XII:8:1-5, 1984

3. Masse FX: Counterpoint: Annual vs. committed dose limits. *Health Phys Soc Newsletter* XII:9:1-4, 1984