

NRC AND ICRP LOWER RADIATION EXPOSURE LIMITS

THE NUCLEAR REGULATORY Commission (NRC) announced in December 1990 that it is lowering its radiation exposure limits for nuclear industry workers and members of the general public. This marks the first complete revision of the NRC's radiation protection requirements since 1960.

The following provisions will go into effect January 1, 1993 for NRC licensees, while Agreement States licensees will have until January 1, 1994 to comply.

- The annual radiation exposure limit to an individual member of the public from NRC-licensed activities is lowered to 100 mrem (1 mSv) from the previous limit of 500 mrem (5 mSv).
- The annual radiation exposure limit for workers in the nuclear industry is lowered to 5 rem (0.05 Sv). The previous limit was 3 rem/calendar quarter (0.03 Sv/quarter) if the worker's dose history was known, with the provision that the cumulative occupational dose not exceed $5 \text{ rem} \times (\text{age} - 18)$.
- NRC licensees are required to implement programs to ensure that all radiation doses are kept as low as is reasonably achievable (ALARA). Previously, the ALARA principle had been a guideline but was not mandatory.
- A standard is established for the protection of a radiation worker's fetus. The radiation exposure limit for the fetus is 500 mrem (5 mSv), contingent on the pregnant worker informing her employer of her pregnancy. Previously, the 500 mrem exposure had been a guideline but not a limit. The NRC notes that the fetus exposure limit is based on a one-time exposure, whereas the exposure limits for the public and radiation workers are based on an annual limit that is cumulative.

In reaching its decision on the revised

limits, the NRC incorporated recommendations made by the International Commission on Radiation Protection (ICRP) in 1977, recommendations made by the National Council on Radiation Protection and Measurements (NCRP) in 1987, and the federal guidance for protection of radiation workers issued by President Reagan in 1987. The NRC also assessed more current data, such as that contained in the 1989 BEIR V Report, and was aware that the ICRP would be issuing recommendations for lower limits in early 1991.

The ICRP passed a final resolution in November 1990 to lower its recommended limit for radiation workers' radiation exposure and the new guidelines were published in early April 1991. ICRP's new recommended exposure limit for radiation workers is 2 rem/yr (0.02 Sv/yr), averaged over five years, with the provision that the dose should not exceed 5 rem (0.05 Sv) in any single year. The 1977 limit was 5 rem/yr (0.05 Sv/yr). The ICRP has maintained its 1977 guideline of 100 mrem/yr (1 mSv/yr) for individual members of the public. The dose limits do not apply to the medical exposure of patients in order to allow physicians to make a clinical judgment on the optimum amount of radiation exposure for their patients. However, the dose limits do apply to those who work in the field of nuclear medicine.

The ICRP analyzed data from the 1988 UNSCEAR Report and the 1989 BEIR V Report as part of its review process before issuing its new recommendations. Hylton Smith, PhD, Scientific Secretary of the ICRP, stressed that the ICRP's overriding concern is that "all practices causing exposure should be justified and protection arrangements should be optimized."

The Society of Nuclear Medicine (SNM) and the American College of Nuclear Physicians (ACNP) responded

to the ICRP's proposed new radiation protection standards in an August 1990 draft statement, which disagreed with the conclusions on radiation risk reached by the ICRP. The SNM/ACNP statement said that the "conclusion that radiation risk has been demonstrated to be higher than previously noted seems on shaky grounds. Before adjusting radiation protection policies that have always been on the conservative side even further, it seems appropriate to wait until there is better scientific data upon which to base decisions, which impact on the cost and benefits to be derived from the productive use of radiation in medicine and other socially relevant areas."

The NCRP published radiation guidance limits in 1987, NCRP Report #91, in which it anticipated that other organizations would soon be lowering limits due to emerging data. Warren Sinclair, PhD, President of the NCRP, says that "the NCRP, in general, supports the fact that the risk factor from radiation exposure is higher than previously thought." He adds that "somewhat lower occupational limits are desirable," noting that "5 rem/yr as a control factor is reasonable but you have to watch the cumulative levels." The 1987 NCRP guidance report addresses this issue. The guidance given is that a cumulative lifetime exposure for radiation workers should not exceed $\text{age} \times 1 \text{ rem}$ (0.01 Sv).

The NCRP is currently in the process of revising the 1987 report, and in light of the new limits announced by the NRC and the ICRP, it will address the issue of whether the guidance limits are adequate. Charles Meinhold, the president-elect of the NCRP, heads the committee that is handling the revision of the 1987 report. He was scheduled to give a progress report on the committee's work at the NCRP's annual meeting on April 4.

Joan Hiam