Synopsis of ICRP Publication 103

The radiation protection framework recommended by the International Commission on Radiological Protection (ICRP) Publication 103 is, in most respects, similar to previous recommendations of the ICRP. The framework continues to be based on the fundamental principles of justification of exposures, optimization of protection, and limitation of dose. In particular, the numerical values of dose limits for occupational and public exposure are unchanged from the 1990 recommendations contained in ICRP Publication 60.

ICRP Publication 103 consolidated the material from ICRP Publication 60 and the subsequent publications into a more consistent and coherent approach to radiation protection in all controllable exposure situations. Previous recommendations distinguished between "practices" where exposures were being introduced, and "interventions," where actions were being taken to reduce an exposure. The 2007 recommendations eliminated these distinctions, and organized the radiation protection framework based on types of exposure situations. Three types of situations were identified: Planned Exposure Situations, typically licensed activities where planning and controls are in place before the exposure is permitted; Emergency Exposure Situations, such as accidents, where there is a need to take immediate actions to reduce exposures; and Existing Exposure Situations, such as radon in homes or decommissioning sites and other situations where the conditions causing exposure are recognized as already present and remedial actions may be necessary to reduce exposures. In doing so, ICRP has placed an increased emphasis on the optimization of protection for all three types of exposure situations and the use of "constraints" as a planning tool for optimization of planned exposure situations and "reference levels" as a planning tool for optimization in emergency exposure situations and existing exposure situations.

The ICRP continues to recommend the use of the linear no threshold (LNT) hypothesis for the development of prospective radiation control programs. The LNT hypothesis assumes that for each incremental increase in radiation dose there is an incremental increase in the probability of cancer even for low doses and low dose rates which are common for occupational doses and for doses to members of the public.

The radiation risk models and assessments that support the recommendations contained in ICRP Publication 103 generally are consistent with the main conclusions of the 2005 National Research Council report, "Health Risks from Exposure to Low Levels of Ionizing Radiation." The ICRP currently recommends a rounded fatal cancer risk value of 5×10^{-4} per rem (5×10^{-2} per Sv). This value takes into account uncertainties in estimates of probability of fatal cancer used in radiation protection and assumes several factors derived from scientific and epidemiological studies for lifespan of the population, quality of the radiation, total-body exposure, and linear response at low doses. Thus, there has been no significant change in risk estimates for radiation exposure from those contained previously in ICRP Publication 60. However, it should be noted that the current risk estimates are greater than the value of 1.25×10^{-4} per rem (1.25×10^{-2} per Sv) that is currently the basis for 10 CFR Part 20.