

# International Commission on Radiological Protection

## Statement on Radon

Approved by the Commission in November 2009

(1) The Commission issued revised recommendations for a System of Radiological Protection in 2007 (ICRP, 2007) which formally replaced the Commission's 1990 Recommendations (ICRP, 1991) and updated, consolidated, and developed the additional guidance on the control of exposure from radiation sources. The Commission has previously issued recommendations for protection against radon-222 at home and at work in *Publication 65* (ICRP, 1993).

(2) The Commission has now reviewed recently available scientific information on the health effects attributable to exposure to radon and its decay products. The Commission's full review accompanies this Statement. As a result of this review, for radiological protection purposes the Commission now recommends a detriment-adjusted nominal risk coefficient for a population of all ages of  $8 \times 10^{-10}$  per Bq h m<sup>-3</sup> for exposure to radon-222 gas in equilibrium with its progeny (i.e.  $5 \times 10^{-4}$  WLM<sup>-1</sup>). The Commission's findings are consistent with other comprehensive estimates including that submitted to the United Nations General Assembly by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR, 2009).

(3) Following from the 2007 Recommendations, the Commission will publish revised dose coefficients for the inhalation and ingestion of radionuclides. The Commission now proposes that the same approach be applied to intakes of radon and progeny as that applied to other radionuclides, using reference biokinetic and dosimetric models. Dose coefficients will be given for different reference conditions of domestic and occupational exposure, taking into account factors including inhaled aerosol characteristics and disequilibrium between radon and its progeny. Sufficient information will be given to allow specific calculations to be performed in a range of situations. Dose coefficients for radon and progeny will replace the *Publication 65* dose conversion convention which is based on nominal values of radiation detriment derived from epidemiological studies comparing risks from radon and external radiation. The current dose conversion values may continue to be used until dose coefficients are available. The Commission advises that the change is likely to result in an increase in effective dose per unit exposure of around a factor of two.

(4) The Commission reaffirms that radon exposure in dwellings due to unmodified concentrations of radium-226 in the earth's crust, or from past practices not conducted within the Commission's system of protection, is an existing exposure situation. Furthermore, the Commission's protection policy for these situations continues to be based on setting a level of annual dose of around 10 mSv from radon where action would almost certainly be warranted to reduce exposure. Taking account of the new findings, the Commission has therefore revised the upper value for the reference level for radon gas in dwellings from the value in the 2007 Recommendations of 600 Bq m<sup>-3</sup> to 300 Bq m<sup>-3</sup>. National authorities should consider setting lower reference levels according to local circumstances. All reasonable efforts should be made, using the principle of optimisation of protection, to reduce radon

exposures to below the national reference level. It is noted that the World Health Organisation now recommends a similar approach (WHO, 2009).

(5) Taking account of differences in the lengths of time spent in homes and workplaces of about a factor of three, a level of radon gas of around 1000 Bq m<sup>-3</sup> defines the entry point for applying occupational protection requirements for existing exposure situations. In Publication 103, the Commission considered that the internationally established value of 1000 Bq m<sup>-3</sup> might be used globally in the interest of international harmonization of occupational safety standards. The Commission now recommends 1000 Bq m<sup>-3</sup> as the entry point for applying occupational radiological protection requirements in existing exposure situations. The situation will then be managed as a planned exposure situation.

(6) The Commission reaffirms its policy that, for planned exposure situations, any workers' exposure to radon incurred as a result of their work, however small, shall be considered as occupational exposure (see paragraph 178 of ICRP, 2007).

### References

- ICRP, 1991. 1990 Recommendations of the International Commission on Radiological Protection. ICRP Publication 60. Ann. ICRP 21 (1-3).
- ICRP, 1993. Protection against Radon-222 at Home and at Work. ICRP Publication 65. Ann. ICRP 23 (2).
- ICRP, 2007. The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103. Ann. ICRP 37 (2-4).
- UNSCEAR, 2009. United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR). UNSCEAR 2006 Report. Annex E. Sources-to-Effects Assessment for Radon in Homes and Workplaces. New York: United Nations, 2009.
- WHO, 2009. World Health Organisation (WHO). WHO Handbook on Indoor Radon: A Public Health Perspective. WHO Press, Geneva, 2009.