

STATEMENT FROM THE 1984 STOCKHOLM MEETING OF THE INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

The International Commission on Radiological Protection (ICRP) held its annual meeting in Stockholm in May 1984, together with its four expert committees. Seventy individuals from seventeen countries attended and reviewed the Commission's current work. Representatives or observers were also present from the Commission of the European Communities, the International Atomic Energy Agency, the International Commission on Radiation Units and Measurements, the International Electrotechnical Commission, the International Radiation Protection Association, the OECD Nuclear Energy Agency, the International Commission for Protection against Environmental Mutagens and Carcinogens, and the United Nations Scientific Committee on the Effects of Atomic Radiation.

The Commission approved five reports for publication in the Annals of the ICRP later in the year. These are:

- Non-stochastic effects of ionizing radiation
- Protection of the patient in radiation therapy
- Major concepts and quantities in use by ICRP
- Protection of the public in the event of major radiation accidents
- Principles of monitoring for the radiation protection of the public.

The Commission reviewed the work of its committees and task groups, and noted that a number of reports are expected to be completed in the next year or so on the following topics:

- Developmental effects of irradiation of the embryo and fetus;
- Metabolism of plutonium and related elements;
- Doses to patients from radiopharmaceuticals;
- Protection of the patient in nuclear medicine;
- Data for evaluating the exposure of workers to external radiation;
- A revision of *ICRP Publications 10, 10A, 24 and 27*;
- Exposure of the public to radon.

In addition, task groups have been established to review the ICRP lung model, to review and upgrade the ICRP Reference Man, to report on the application of basic radiation protection principles to radioactive waste disposal, and to develop the application of techniques other than cost-benefit analysis in the optimization of radiation protection.

Committed Effective Dose Equivalent

At the Stockholm meeting the Commission reviewed those aspects of its policy underlying the use of committed dose equivalent. The Commission confirms that its policy is to limit the risk *committed* by each year of operation, no credit being taken for earlier years if these have committed lower risks or for future years in the expectation of improved conditions of exposure.

This objective is achieved by the use of annual limits on intake calculated from the committed dose equivalent, using a 50-year integrating period.

The Commission recognizes that there are practical difficulties in using monitoring results to estimate annual intakes of some materials, notably plutonium, but it believes that these difficulties can be overcome and that their existence does not invalidate the above conclusions.

Sealed Source Beam Therapy

In paragraph 157 of *ICRP Publication 33* ("Protection against ionizing radiation from external sources used in medicine") the Commission made the following recommendation:

Every sealed γ -ray source used for beam therapy shall be enclosed in a housing such that, with the beam control mechanism in the OFF position, the air-kerma rate from the leakage radiation measured at a distance of 1 m from the source does not exceed $10 \mu\text{Gy h}^{-1}$. At any readily accessible position 5 cm from the surface of the housing, the air-kerma rate from the leakage radiation shall not exceed $200 \mu\text{Gy h}^{-1}$.

This recommendation replaced one given in *ICRP Publication 15* ("Protection against ionizing radiation from external sources") in which the exposure rate at one meter from the source, while in the off position, was limited to 2 mR/h. This reduction by a factor of 2 was recommended by the Commission because the previous limit was based on designing the equipment to ensure that the dose limits were not exceeded rather than by the process of optimization of protection.

Information available to the Commission suggests that the collective dose from existing teletherapy units (designed according to the recommendation made in *ICRP Publication 15*) is unlikely to exceed 10^{-2} man. sieverts per year for each unit. For this reason, backfitting of existing equipment is not required, and design of new equipment should be based on the recommendation given in *ICRP Publication 33* unless realistic cost-benefit analysis, as described in *ICRP Publication 37*, clearly shows that this is not justified by the increased cost.

Review of the Bases of the Commission's Risk Estimates

The Commission and its expert committee on radiation effects has continued its critical review of epidemiological and related reports on the effects of human exposure to radiation. This review included a number of papers suggesting higher risks of cancer induction per unit dose at low doses than those used by ICRP for purposes of radiation protection; these papers were based mainly on studies of populations exposed as a consequence of test explosions in the USA. Other papers concerned with risk estimates were based on studies of the survivors of atomic bombs in Hiroshima and Nagasaki, and of exposures incurred during medical therapy. Reports were also examined which are described as indicating reductions in the risk of harmful effects as a result of exposure to low doses.

No reliable evidence could be derived from these reports to indicate that a change is needed in current estimates of the overall risk of cancer induction per unit dose, or in estimates for particular organs, these risk estimates being the basis of the Commission's recommendations.

Reports were received of the progress in re-evaluating the doses to which survivors in Hiroshima and Nagasaki were exposed. The implications of this re-evaluation, and of a continuing survey of reports of the cancer incidence and mortality in the survivors, will be reviewed when further information becomes available.

In 1982 the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) reported a lower estimate of the genetic risks of radiation than that based on the evidence available at the time of its 1977 report, from which the Commission's genetic risk estimates were derived. The bases for this reduction are under review, as are the estimates of the amounts of detriment resulting from the forms and frequencies of inherited abnormality and congenital anomalies that are induced by radiation. These estimates will be incorporated in the Commission's future appraisals of radiation risk.

UNSCEAR is engaged also in studies of the dose-effect relationships for radiation risks at

moderate and at low doses, and the frequencies observed in different organs and tissues at moderate doses. The Commission is in close touch with this work.

The Commission has also reviewed the information published recently¹ defining the periods during pregnancy at which mental retardation appears to have been caused by radiation exposure of the developing child, and the risk per unit dose of this occurrence. Attention has already been drawn to the impact of this finding upon the protection of the embryo or fetus.² The Commission is informed of the further studies in progress on the induction of these abnormalities.

References

1. Otake, M. and Schull, W. J. *In utero* exposure to A-bomb radiation and mental retardation: a reassessment. *Br. J. Radiol.* **57**, 409-414, 1984.
2. ICRP. Exposure of women to ionizing radiation. Statement from the 1983 Washington meeting of ICRP. *Annals of the ICRP*, **14**, No. 1, vi-vii, 1984.