

## STATEMENT FROM THE 1978 STOCKHOLM MEETING OF THE INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

The International Commission on Radiological Protection (ICRP) held its annual meeting in Stockholm in May, 1978, together with its four expert committees. Sixty-five individuals from seventeen countries were present to review the Commission's current work and to decide on a programme of work for the next 4-year period. 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 International Society of Radiology, the OECD Nuclear Energy Agency, the United Nations Environment Programme, the United Nations Scientific Committee on the Effects of Atomic Radiation and the World Health Organization.

### ICRP PUBLICATION 26

The Commission also reviewed its 1977 recommendations (*ICRP Publication 26*) and identified the following points that require clarification.

#### *Estimates of radiation risk*

The risk factors given by the Commission in *ICRP Publication 26* (paragraphs 36-60) are based on advice received from its committee on radiation effects. They are consistent with data available in the scientific literature and with information included in the 1977 report of the UNSCEAR.

In the light of its continuing review of the published information on the epidemiological and radiobiological evidence of radiation risks to man, the Commission has concluded that the information available up to May 1978 does not call for changes in the risk factors given in *ICRP Publication 26*. These risk factors

are intended to be realistic estimates of the effects of irradiation at low annual dose equivalents (up to the Commission's recommended dose-equivalent limits).

In dealing with the stochastic effects of ionizing radiation the Commission recommended (in paragraph 105 of *ICRP Publication 26*) weighting factors for application to the dose equivalent in various organs and tissues. The Commission wishes to point out that it did not intend the hands and forearms, the feet and ankles, the skin and the lens of the eye to be included in the "Remainder". These tissues should therefore be excluded from the computation of  $\sum_T w_T H_T$ . In order to prevent the occurrence of non-stochastic effects, the Commission recommends that the relevant dose-equivalent limits given in paragraph 103 should apply to these tissues.

In the assessment of detriment from exposure of population groups a small risk of fatal cancer resulting from exposure of

the skin may need to be taken into account, for example in the case of exposure of the whole skin from soft beta radiation. In this case a risk factor in the region of  $10^{-4} \text{ Sv}^{-1}$  may be applied to the mean dose over the entire surface of the skin, which would correspond to a value of  $w_T$  of about 0.01.

The Commission's occupational dose limits are intended to apply to all workers, and are based on average values of risk factors for male and female adults. The variations of risk with exposure at different ages in the two sexes, referred to in paragraph 38 of *ICRP Publication 26*, are discussed in *ICRP Publication 27*, a report to the Commission on "Problems involved in developing an index of harm". This report also reviews the basis for the selection, in *ICRP Publication 26* (paragraph 60) of an average genetically significant fraction (0.4) of occupational exposure and the mean mortality risk factor ( $10^{-2} \text{ Sv}^{-1}$ ) for both sexes and all ages.

#### *Effective dose equivalent*

The Commission recommends that the sum  $\sum_T w_T H_T$  (see paragraph 104 of *ICRP Publication 26*) be called the effective dose equivalent (denoted  $H_E$ ).

#### *Modifications to the text of ICRP Publication 26*

The Commission believes that the following textual revisions to certain paragraphs in *ICRP Publication 26* will clarify their meaning.

- (38) The fourth and fifth sentences should read:

For protection purposes therefore, sufficient accuracy is obtained by using a single effective dose-equivalent limit for all workers regardless of age or sex. This limit is based upon the average-risk levels described

below for the various organs or tissues.

- (79) The first sentence should read:  
The Commission's dose-equivalent limits for workers are intended to apply to the sum of the dose equivalent resulting from external exposure during 1 year and the committed dose equivalent from that year's intake of radionuclides.
- (79) Add the following sentence at the end of the paragraph:  
Similar principles apply to the dose-equivalent limits for members of the public.
- (89) In the second sentence the following should be deleted:  
"are intended as guides for planning purposes, and thus"
- (93) In the first sentence the following should be deleted:  
"are intended for planning purposes and"
- (107) The end of the last sentence should read:  
... namely, the limit to the deep and shallow dose-equivalent indices  $H_{1,d}$  and  $H_{1,s}$  (see paragraph 108) and ALI (see paragraph 109).
- (108) The last part of the first sentence should read:  
... it is possible to assess the *maximum* value of dose equivalent that would occur at a depth of 1 cm or more in a 30 cm diameter sphere (the deep dose-equivalent index,  $H_{1,d}$ ).
- (108) The following sentence should be added at the end of the paragraph:  
In addition, the shallow dose-equivalent index (the maximum dose equivalent in the shell from 0.07 mm to 10 mm depth in the 30 cm sphere) should be limited to 500 mSv to

provide protection for the skin. In practical situations, these limits on the deep and shallow dose-equivalent indices will limit the annual dose equivalent in the lens of the eye to less than 300 mSv.

(110) The paragraph should read:

When external and internal exposures are received together, the Commission's recommended dose limits will not be exceeded if both the following conditions are met:

$$\frac{H_{I,d}}{H_{E,L}} + \sum_j \frac{I_j}{I_{j,L}} \leq 1$$

and

$$\frac{H_{I,s}}{H_{sk,L}} \leq 1$$

where  $H_{I,d}$  is the annual deep dose-equivalent index,  $H_{I,s}$  is the annual shallow dose-equivalent index,  $H_{E,L}$  is the annual limit of the effective

dose equivalent (50 mSv),  $H_{sk,L}$  is the annual limit of dose equivalent in the skin (500 mSv),  $I_j$  is the annual intake of radionuclide  $j$ ,  $I_{j,L}$  is the annual limit of intake for radionuclide  $j$ .

(113) The second sentence should read:

In such circumstances external exposures and intakes of radioactive material may be permitted provided that the sum of the dose equivalent from the external exposure and the committed dose equivalent from the intake of radionuclides does not exceed twice the relevant annual limit in any single event, and, in a lifetime, five times this limit.

(187) In the first sentence, the term "dose-equivalent limit" should be replaced by "system of dose limitation".

(238) In the last sentence the term "monitoring of control" should read "monitoring or control".

## SECONDARY LIMITS FOR INTERNAL EXPOSURE

The first group of values of annual limits of intake (ALI) for radiation workers, together with the text of a report that includes the methods of calculation and metabolic data for 22 elements, were available at the Commission's meeting in Stockholm, and are now in the course of publication in a report to be entitled "Limits for intakes of radionuclides by workers". Similar information on additional elements

will be published as soon as it becomes available.

Organ dose estimates for members of the public cannot be derived directly from the data given for workers because of differences in metabolism, organ size and duration of exposure. The Commission is therefore planning to issue specific guidance on the assessment of internal exposure of members of the public.

## CURRENT WORK OF ICRP

Four reports are being completed, preparatory to publication in the *Annals of the ICRP*. The titles of the reports are: —

— Biological effects of inhaled radionuclides.

— Limits for intakes of radionuclides by workers (to replace *ICRP Publication 2*).

— Radionuclide releases into the environment: assessment of doses to man.

- Monitoring for internal contamination due to occupational exposure (to replace *ICRP Publications 10 and 10A*).
- Risks to the human embryo and foetus – with special reference to occupational exposure of women.
- Doses to patients from radiopharmaceuticals.
- Protection in all fields in which ionizing radiations are employed in medicine.
- The practical application of the Commission's recommendations.
- Application of the ICRP system of dose limitation to practices that modify man's exposure to natural background radiation.

A full programme of work is planned for the Commission and its committees and task groups in the immediate future. Subjects receiving urgent review include the following:

- Non-stochastic effects of irradiation.
- Risks and RBEs of high-LET radiation for carcinogenesis.
- Somatic and hereditary risks of irradiation at low doses.

During its term of office the Commission plans to prepare revised versions of its Publications 7, 10, 12, 13, 15/21, 16, 17 and 24.

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