Euratom safety standards

by H. Seguin*

For more than 20 years the radiation protection legislation of the European Community's Member States has been based on the Council Directive which laid down the basic safety standards for the health protection of the general public and workers against the dangers of ionizing radiation. The Euratom Treaty of 1957 makes it incumbent upon the Community to establish and apply harmonized standards.

In order to take scientific and technical developments into account, the basic safety standards, which were originally established in 1959, were revised on several occasions – in 1962, 1966, 1976 and, most recently, in 1980. The main scientific basis for the basic safety standards are the recommendations of the International Commission on Radiological Protection (ICRP). For quantities and units the Commission relies on the recommendations of the International Commission on Radiation Units and Measurements (ICRU).

ICRP Publication No. 26 (1977) was the main basis for the review of the basic safety standards in 1980. On the basis of the ICRP recommendations the main principles for limiting the risk are:

- *Justification:* every activity involving exposure to radiation must be justified by the advantages associated with this activity;
- *Optimization:* every exposure to radiation must be kept as low as is reasonably achieveable;
- *Limitation:* the sum of the doses and committed doses may not exceed the limits which have been established.

The basic limits are the dose-equivalents. The secondary limits comprise the dose-equivalent index quantities and the limit values for incorporation. For the purposes of practical radiation protection, the European basic safety standards allow the use of other equivalent measurement quantities instead of the index quantities, because the introduction of the index quantities gives rise to difficulties in practice, in particular as regards additivity.

The limits of annual intake for workers were taken from the ICRP publications. As the ICRP had not yet prepared any limits for the general public, these limits were reduced to one-tenth for adult members of the public, in line with the dose limits for members of the public.

Annex III contains limits of annual intake by inhalation, and derived limits of concentration of radionuclides in the air inhaled for exposed workers, and limits of annual intake by inhalation and ingestion for members of the public. When the basic safety standards were revised in 1980, the list of values for the radionuclides was not yet complete. As a result, a directive amending the Annexes is now being prepared and the normal procedure for approval by the Council of Ministers is opened.

The new ICRP values available in 1980 were incorporated into these two annexes, while for the remaining nuclides it was necessary to retain the existing values for maximum permissible concentrations. The limit values for intake were derived from these. Since the basis of calculation had changed in that it was now the effective dose-equivalent instead of the dose received by critical organs which was to be limited, the simultaneous use of limit values from different sources meant a certain lack of logical consistency. Consequently, the new values are now being assigned to the remaining radionuclides. A number of radionuclides of importance in radiation protection have also been added to the list.

The radiotoxicity categories which form the basis for exemption limits are derived from the intake values. The division into the various radiotoxicity categories was made in accordance with the principles described in the IAEA publication *Technical Reports Series* No. 15 (1963) and in *ICRP Publication* No. 5 (1964).

The measures to protect the general public cover a wide field. Member States have a duty to keep the exposure risks faced by the general public within acceptable limits. Protective measures are to be taken, *inter alia,* in the medical field and in other areas. They must include the examination and testing of protective arrangements. Dose measurements must be carried out. The radiation exposure of the population as a whole must be kept to a minimum and be no more than absolutely necessary. The sum of the various doses must be kept under review, and the related genetic dose must be estimated. The Commission must be informed of the results.

This requirement has not yet been fully met in the Member States since the process of incorporating the new basic standards into legislation is not yet complete and there is as yet no standardized set of estimation procedures. To enable comparisons to be made, the same criteria for estimation purposes must be used in all Member States. Here, absolute accuracy is of secondary

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importance. Determining relative deviations and, in particular, trends over time is more important if suitable counter-measures are to be taken in good time.

The basic standards in the Council Directive also extend the main radiation protection principles, except for that relating to limitation, to medical examinations and treatment.

In all Member States, radiation exposure for medical purposes accounts for the largest proportion of exposure to artificial radiation. The Commission has therefore drawn up a special Council Directive, which is now awaiting a decision by the Council, that lays down basic measures for the radiation protection of persons undergoing medical examinations or treatment. This Directive provides that radiation can be administered only by persons who have received training in the techniques applied and in radiation protection procedures; that the installations used must be kept under surveillance to ensure that they meet radiation protection and quality requirements; that radiological examinations should be carried out only if there are medical grounds for doing so; and finally, that individual or collective preventive radiological examinations should not be carried out unless they are medically or epidemiologically justified. In order to keep a check on the quality of installations, the Commission has specified that quality control measures should be taken in the medical field with a view to reducing radiation exposure and avoiding unnecessary expenditure. If the Directive is approved by the Council, the Member States of the European Community will be obliged to bring in legislation in line with its principles.