II

(Acts whose publication is not obligatory)

COMMISSION

COMMISSION RECOMMENDATION

of 21 February 1990

on the protection of the public against indoor exposure to radon

(90/143/Euratom)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Atomic Energy Community, and in particular Article 33, second paragraph, thereof,

Having consulted the group of experts appointed by the Scientific and Technical Committee pursuant to Article 31 of the Treaty,

Whereas :

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In many Member States there is increasing awareness of the significance of indoor exposure of the population to radon. Several countries already have or are drawing up dose-control policies ;

It is the task of the Commission to harmonize Member States' provisions for the application of the basic safety standard for the health protection of the general public against the dangers arising from ionizing radiation ;

The Commission, therefore, asked the group of experts, set up under the terms of Article 31 of the Treaty, to examine the problem and to draw up proposals for any appropriate action ;

The group has now reported to the Commission and the present recommendation is based on its report ;

This is without prejudice to the Commission's ongoing work of developing a global approach to the problems of indoor pollution ;

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Radon is a naturally occurring radioactive gas, the most significant isotope of which is radon-222 with a half life of 3,82 days. This is a member of the uranium-238 decay series and its presence in the environment is associated mainly with the trace amounts of its immediate parent, radium-226, in rocks and soils. The major contributor to radon concentration in dwellings is soil gas which may enter indoor air spaces through floors by pressure-driven or concentration-driven flow ; in most countries, the contribution from building materials, except in special cases, is usually minor by comparison ;

Recent surveys in Member States have shown average concentrations indoors of some 20 to 50 Bq/m^3, with typical outdoor values an order of magnitude lower. Compared to other forms of natural radiation the chief characteristic of indoor radon levels is their variability ; in many countries some dwellings exhibit radon levels more than an order of magnitude above the average ;

The dose from inhaled radon gas is low in comparison to that from its short-lived radioactive daughters, which are isotopes of polonium, lead and bismuth. When inhaled, these deposit on surfaces of the human respiratory tract and the most significant doses arise from alpha irradiation of the bronchial epithelium. A task group of the International Commission on Radiological Protection (ICRP), set up to study the lung cancer risk from indoor exposure

to radon daughters, reported on these doses in 1987 (1). On the basis of current exposure models it implied a conversion coefficient around 20 Bq/m³ per mSv/year between the time-averaged activity concentration of radon gas and the annual effective dose equivalent for indoor exposure of members of the public. Consequently, typical annual doses in dwellings in the Community lie in the range 1 to 2,5 mSv with a small percentage of the population in some countries receiving more than 20 mSv per year. For comparison, the current annual dose limit for exposure of members of the public to man-made radiation, as laid down in the Community basic safety standards (2), is 5 mSv;

Exposure to radon is not a new phenomenon and epidemiological studies of various groups of minors exposed to elevated concentrations at work have revealed an excess of lung cancer deaths. While at present there is no firm evidence of the effect of indoor radon exposure on the general public, on the available evidence it appears prudent for the Commission to make recommendations for limiting such exposure, as indeed the ICRP has already done (3);

It must be noted that indoor radon is controllable in the physical or engineering sense. Therefore, criteria of radiological safety would allow the development of practical guidelines for remedial action in existing buildings. For future buildings preventive measures are required based upon appropriate design and construction specifications. Such a preventive approach justifies the adoption of a design level which is lower than the reference level for remedial action in existing buildings;

Simple metrological procedures should be established to ensure that measurements of indoor radon yield data of the appropriate quality and reliability;

To promote the control of exposure to indoor radon in the Community, the Article 31 group of experts drew up detailed guidance which as been incorporated in the present recommendation and is consistent with the guidance provided by ICRP. It is achievable in a pratical sense;

Finally, it must also be mentioned that due to the special characteristics of the problem adequate public information is an important element both in improving the controllability of exposure and on assuring a positive public response,

HEREBY RECOMMENDS:

1. An appropriate system be established for reducing any exposure to indoor radon concentrations. Within this system adequate public information and response to public concern deserve particular attention.

2. For existing buildings:

(a) a reference level for consideration of remedial action be used: where exceeded, it should be cause for consideration of simple but effective measures aimed at reducing the radon level;

(b) the reference level be an effective dose equivalent of 20 mSv per annum, which for practical purposes, may be taken as equivalent to an annual average radon gas concentration of 400 Bq/m³;

(c) the urgency of the remedial action take account of the extent to which this reference level is exceeded;

(d) where remedial actions are considered necessary, the public concerned be informed on the radon levels it is exposed to and on the remedies available to reduce such levels.

3. For future constructions:

(a) a design level be used to aid the relevant authorities in establishing regulations, standards, or codes of construction practices for circumstances under which the design level might otherwise be exceeded;

(b) the design level be an effective dose equivalent of 10 mSv per annum, which for practical purposes, may be taken as equivalent to an annual average radon gas concentration of 200 Bq/m³;

(c) information be provided to those involved in the construction of new buildings, as relevant, on possible radon exposure levels, and on preventive measures which could be taken.

4. When remedial or preventative measures are being determined, the principles of optimization be applied in accordance with the Community basic safety standards (4).

(1) Lung cancer risks from indoor exposures to radon daughters. *Annals of the ICRP*, Vol. 17, No 1, 1987, Publication 50, Pergamon Press.

(2) Council Directive 80/836/Euratom of 15 July 1980 amending the Directive laying down the basic safety standards for the health protection of the general public and workers against the dangers of ionizing radiation, OJ No L 246, 17. 9. 1980, p. 1.

(3) Principles for limiting exposure of the public to natural sources of radiation. *Annals of the ICRP*, Vol. 14, No 1, 1984, Publication 39, Pergamon Press.

(4) Commission communication concerning the implementation of Council Directives 80/836/Euratom of 15 July 1980 amending the Directives laying down the basic safety standards for the health protection of the general public and workers against the dangers of ionizing radiation and 84/467/Euratom of 3 September 1984 amending Directive 80/836/Euratom, OJ No C 347, 31. 12. 1985, p. 9.

5. Because of diurnal and seasonal variations of indoor radon levels, radiation protection decisions should in general be based on the annually-averaged measurements of radon gas or daughters in affected buildings using integrating techniques. The competent authorities should ensure that the quality and reliability of measurements are adequate.

6. Criteria be developed for identifying regions, sites and building characteristics likely to be associated with high indoor radon levels. Investigation levels for the underlying parameters (i.e. activity in soil and building materials, permeability of ground, etc.) could be used to identify such exposure circumstances.

This recommandation is addressed to the Member States.

Done at Brussels, 21 February 1990.

For the Commission

Carlo RIPA DI MEANA

Member of the Commission