HEALTH PHYSICS SOCIETY

IONIZING RADIATION-SAFETY STANDARDS FOR THE GENERAL PUBLIC

POSITION STATEMENT OF THE
HEALTH PHYSICS SOCIETY*

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The Health Physics Society recommends that standards and regulations for radiation safety of the general public be based on the current scientific consensus represented in recommendations of the International Commission on Radiological Protection (ICRP) and the National Council on Radiation Protection and Measurements (NCRP), i.e., ICRP (1991) and NCRP (1993).

The Society's principal recommendations about radiation-safety standards for the public are:

1. Justifiable sources of radiation exposures are those that result in an overall net benefit to society.

2. Radiation exposures of the public from controllable sources[1] should be maintained as low as reasonably achievable (ALARA), economic and social factors being taken into account. However, ALARA should not be quantified with respect to dose goals or monetary cost, e.g., dollars per person-rem.

3. Public radiation-safety standards should be based on specified values of dose rather than hypothetical estimates of risk. These standards should be expressed as an effective dose[2] resulting from all exposure pathways.

4. The sum of effective dose(s) to individual members of the public from exposure to controllable sources with the exception of occupational exposure, accidental releases, and indoor radon[3], normally should be limited to 1 mSv (100 mrem)[4] in any year. In special (infrequent) circumstances, an effective dose up to 5 mSv (500 mrem) in a year may be permitted.

5. Constraints should be applied to each controllable source of public exposure to ensure that the dose limit for an individual from all controllable sources combined will be met. An effective dose of 0.25 mSv (25 mrem) in any year to individual members of the public is a suitable source constraint in most cases. In special circumstances, an effective dose higher than 0.25 mSv in a year may be permitted.

Footnotes

[1] A controllable source is any source of radiation exposure for which reasonable actions can be taken to limit radiation exposure without resulting in adverse effects on individuals. Examples of controllable sources include:

- Any source of man-made radiation exposure in the workplace (i.e., occupational exposure).
- Any facility or other operation that results in releases of man-made or technologically enhanced, naturally occurring radionuclides to the environment.
- Exposures from radiation-producing machines.
- Any localized areas of environmental contamination resulting from planned or accidental releases of radioactive material or disposal of radioactive waste.
- Technologically enhanced, naturally occurring radioactive material.
- Medical exposures to individuals who are not the subject of the medical procedure resulting in the exposure.
- Indoor radon.

Examples of sources that are not controllable include:

- Natural terrestrial background radiation.
- Cosmic radiation.
- Naturally occurring radioactive material present inside the body.
- Medical exposures to individuals who are the subject of the medical procedure resulting in the exposure.
- Global fallout of radionuclides from atmospheric testing of nuclear weapons.
- Regional or global radioactive contamination from accidental releases of radioactive material.

[2] The effective dose is a quantity developed by the ICRP (1991) for purposes of radiation protection. The effective dose is assumed to be related to the risk of a radiation-induced cancer or a severe hereditary effect. It takes into account: (1) the absorbed doses that will be delivered to the separate organs or tissues of the body during the lifetime of an individual due to intakes of radioactive materials; (2) the absorbed doses due to irradiation by external sources; (3) the relative effectiveness of different radiation types in inducing cancers or severe hereditary effects; (4) the susceptibility of individual organs to develop a radiation-related cancer or severe hereditary effect; (5) considerations of the relative importance of fatal and non-fatal effects; and, (6) the average years of life lost from a fatal health effect.

[3] Limits for occupational exposure to radiation workers are in addition to the exposure received as a member of the public in a non-occupational setting and are discussed in a separate Society position statement (HPS 2000). The Society has a separate position statement regarding the approach to general public protection from radon in the home (HPS 1990). Indoor radon is not, therefore, included in the scope of the sources subject to this effective dose limitation. The Society has not taken a position on exposures resulting from accidental releases of radioactive materials even though they are considered a controllable source requiring regulatory consideration. However, they require separate consideration and should not be included in the scope of the sources subject to this effective dose limitation which is intended for exposures from routine and normal use of radioactive materials.

[4] The sievert (Sv) is the special name for the international (SI) unit of effective dose. The Society endorses the use of SI units; however, because U.S. regulatory agencies continue to use traditional units in regulations, this Position Statement also gives the effective dose in rem, which is the special name for the traditional unit. The milliSievert (mSv) and millirem (mrem) are 1000th of a Sievert and rem, respectively. 100 mrem = 1 mSv.

References

Health Physics Society (HPS). "Perspectives and Recommendations On Indoor Radon: Position Statement of the Health Physics Society," McLean, VA. Adopted: October 1990

Health Physics Society (HPS). "Occupational Radiation-Safety Standards and Regulations Are Sound: Position Statement of the Health Physics Society," McLean, VA. Adopted: March 2000

International Commission on Radiological Protection (ICRP). *1990 Recommendations of the International Commission on Radiological Protection.* Oxford: Pergamon Press; ICRP Publication 60, *Ann. ICRP* 21(1-3); 1991.

National Council on Radiation Protection and Measurements (NCRP). *Limitation of Exposure to Ionizing Radiation.* Bethesda, MD: NCRP; NCRP Report No. 116; 1993.

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* The Health Physics Society is a non profit scientific professional organization whose mission is to promote the practice of radiation safety. Since its formation in 1956, the Society has grown to approximately 6,000 scientists, physicians, engineers, lawyers, and other professionals representing academia, industry, government, national laboratories, the department of defense, and other organizations. Society activities include encouraging research in radiation science, developing standards, and disseminating radiation safety information. Society members are involved in understanding, evaluating, and controlling the potential risks from radiation relative to the benefits. Official position statements are prepared and adopted in accordance with standard policies and procedures of the Society. The Society may be contacted at: 1313 Dolley Madison Blvd,. Suite 402, McLean, VA 22101; phone: 703-790-1745; FAX: 703-790-2672; email: HPS@BurkInc.com.