

**WEACAU-III: International Workshop on
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Revised International Basic Safety Standards: the radon approach

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Abstract

The International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (the BSS) were published in 1996. According to the IAEA approach safety requirement documents are reviewed regularly to assess the need for a revision. Following a review in 2006, the IAEA Board of Governors decided to conduct the revision process which started in 2007.

The revision of the BSS was scientifically accompanied and supervised by a joint Secretariat consisting of eight international organizations: the European Commission (EC); the Food and Agriculture Organization of the United Nations (FAO); the International Labour Organization (ILO); the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (OECD/NEA); the Pan American Health Organization (PAHO); the United Nations Environment Programme (UNEP) and the World Health Organization (WHO), as well as the IAEA.

Meanwhile the governing bodies of all cosponsoring organizations approved the revised BSS, which was published in 2011 as “Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, IAEA Safety Standard Series No. GSR Part 3 (Interim)” [1]. The final edition will be issued beginning of the next year.

The BSS take into account the IAEA Fundamental Safety Principles [2] as well as the findings of the 2008 Report of the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) [3], and the publications of the International Commission on Radiological Protection (ICRP) [4-7].

The structure of the revised BSS reflects the radiation protection approach and the terminology advocated by the ICRP in its Publication 103. The requirements of the BSS apply to all exposure situations and to all categories of exposure. Three exposure situations are postulated: planned, emergency and existing exposure situations and three categories of exposures: occupational, medical and public. Concerning radon exposure the BSS considers occupational exposure due to radon at workplaces and public exposure due to radon in dwellings which can arise in both planned exposure situations and existing exposure situations. Particular precautionary recommendations were given to radon indoors.

With regard to public exposure due to radon indoors the BSS require that the government shall ensure that information on activity concentrations of radon is gathered, including information on associated health risks and the increased risk relating to smoking is provided to members of the public and also to interested parties. Governments shall also ensure that based on a graded approach an action plan

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is established for controlling and reducing the radon levels for existing buildings and future buildings. For this purpose it is required to establish a reference level for dwellings and other buildings which should not exceed 300 Bq/m³ based on an optimization process. Therefore a programme should be established to identify building materials that may lead to exposure of members of the public that is higher than the reference level for building materials. Residues from NORM industries, such as fly-ash (from coal and peat burning) and phosphogypsum, are sometimes used in the production of building materials. The International BSS consider that a situation of exposure due to radionuclides of natural origin in construction material should be treated as an existing exposure situation regardless of the activity concentrations of the radionuclides concerned [1]. The reference level for exposure to radon at workplaces, also expressed in radon activity concentration, is set to 1000 Bq/m³. Both values correspond to an effective dose of about 10 mSv per year according to current ICRP recommendations.

Since 2001 regulations are in place in Germany to confine the NORM-related contribution to both external exposure and radon exposure from building materials to less than 1 mSv/a. However, no regulations exist so far to restrict doses from natural radioactivity in building materials, irrespective of the origin. This will, however, be necessary after the enforcement of the revised European Basic Safety Standards, which will include a reference level for external exposure from building materials of 1mSv/a, leaving it to the Member States to establish an additional reference level for exposures caused by radon exhaling from building materials. The radon reference level should be an integral part of the general radon protection strategy of the respective Member State.

Recent investigations of the Federal Office for Radiation Protection (BfS) have shown that the building materials currently used in Germany do not cause significant radon exposures, the highest estimated radon concentrations related to building materials are being about 20 Bq/m³ [8]. Additives such as coal ash do not cause problems in this respect because of low radium contents in coal and ash, respectively, in Germany. Nonetheless, control of the building materials contribution to indoor radon concentrations seems advisable, since radium contents of coal ash, as a widely used additive to concrete, may vary, depending on the coal deposits. Also, it is generally known that the major source of indoor radon is not building materials but soil gas. Building materials should not compromise the protective aim for new buildings concerning radon concentrations. The indoor reference level is likely to be set in the range of 200 to 300 Bq/m³. It seems adequate to define a reference level for building materials related radon concentrations of about one tenth of the chosen value.

In cooperation with WHO the IAEA developed a draft guidance with respect to radon exposure in dwellings which contains advice on following main topics

- National radon policy and the role of the national authority
- Radon measurement programme
- National action plan [9].

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