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# RADIATION EXPOSURE FROM THE USE OF NORM IN BUILDING MATERIALS IN GERMANY

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Since 2001, the use of NORM in building materials is under regulatory control in Germany. Based on an additional effective dose of 1 mSv per year and generic exposure models, maximally allowable concentrations of radionuclides in residues from specific industrial processes and their contents in building materials were defined. Thereby external exposure as well as inhalation of radon were taken into account.

Within the framework of the current revision of the EU Basic Safety Standards regulations on natural radioactivity in building materials will be introduced. In principle, this will make specific regulations on NORM in building materials superfluous. However, radon inhalation is not considered explicitly, following the argumentation of publication RP 112 that a level of 200 Bq/m³ will not be exceeded in case the so called activity concentration index is not exceeded. The Federal Office for Radiation Protection in Germany (BfS) is recommending a reference level of 100 Bq/m³, corresponding to the lower value of the 100 - 300 Bq/m³ range recommended in the newly published WHO Radon Handbook. This level must not be exhausted solely by the contribution from building materials. Against this background, the above mentioned argumentation of RP 112 is worth being scrutinized.

Between 2007 and 2009**,** the BfS in collaboration with the German Building Materials Association investigated the contents of natural radioactivity in different types of current building materials in Germany and resulting doses, including the contribution of radon inhalation. For classical building materials such as brick and light-weight concrete, exposures may be as high as 1 mSv/a via external exposure and 0.5 mSv/a via inhalation of radon. However, the contribution of re-used NORM residues to the radiation exposures is currently rather low due to both, confined usage and low concentrations of radioactivity. The current talk deals with the methodology and detailed results of our investigations in its first part and a proposal how to deal with the problem of natural radioactivity in building materials in Germany in the second part.
Irrespective of the origin of the radioactivity in building materials we propose to take into account radon exposures explicitly in possible regulations on building materials in Germany. Our approach is to restrict external exposure to 1 mSv/a and radon concentrations separately to a value of about 20 Bq/m³. This guarantees compliance with the recommendations of RP 112 on the one hand and restriction of radon concentrations to values not contributing significantly to a reference level of 100 Bq/m³ on the other hand. Our investigations suggest that such an approach would generally not impose

undue burdens on building material producers in Germany or hinder the re-use of residues from NORM industries.