

International Conference on the Management of Naturally Occurring Radioactive Materials (NORM) in Industry

VIRTUAL EVENT

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Control of Building Materials and Basic Safety Standards

Already decades ago UNSCEAR Reports reported that exposures to occupants due to natural radionuclides in building materials cannot be always neglected. Radionuclides concerned are from ^{238}U and ^{232}Th series, and the radioactive isotope of ^{40}K . Uncontrolled use of such materials resulted in restrictions, sometimes with large remedial costs.

Exposures are either internal, i.e. due to radon or thoron, or external due to gamma radiation emitted from the building materials. Although the latter exposures are usually low, regulatory bodies (RBs) shall pay attention to specific types of materials causing exposures which cannot be neglected from the point of view of radiation protection. Such materials used in NORM industry might be:

- raw materials, e.g. granite,
- residues from the industry, e.g. fly ash and phosphogypsum.

As a rule, building materials which are widely used in local communities are also produced locally. Globally, the ways buildings are constructed, and their uses vary significantly. Therefore, it is not unexpected that there is still no internationally accepted limits for radionuclides in building materials.

According to IAEA GSR Part 3 [1] indoor exposures of occupants due from construction materials is “existing exposure situation”. The para. 5.22 notes that the specific reference level »shall typically be expressed as, or be based on, an annual effective dose to the representative person that generally does not exceed a value of about 1 mSv«. Furthermore, para. I.12 tackles residues to be recycled into construction materials.

Regarding the EU, the EC published guides on building materials [2, 3] recommending a control based on a dose in the range 0.3 –1 mSv/y. Today Basic Safety Standard Directive (EU BSS) [4] sets requirements which are largely harmonized with the IAEA guide [5]. This control has few steps, namely:

- identification of types of materials to be of concern,
- setting measurements protocols for measurements of activity concentrations (A) in screening process,
- dose assessment,
- setting restrictions on a use of materials when necessary.

Such control might be substantial burden to construction industry, RBs and other stakeholders. In the last years first steps toward standardised control were initiated, e.g. developing technical standards on dose assessment and measurements of A (CEN standard and report) and MetroNORM. As construction industry is global further development of common approach to a control of building materials is needed, e.g. on common reporting on A, taking also into account that recycling, i.e. by-products or rubble from buildings, is a global trend.

[1] IAEA, GSR Part 3, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, IAEA, Vienna, 2014

[2] EC, Radiation Protection 96 Enhanced Radioactivity of Building Materials, EC, 1997

[3] EC, Radiation Protection 112, Radiological Protection Principles concerning the Natural Radioactivity of Building Materials, EC, 1999

[4] Council Directive of 5 December 2013 laying down Basic Safety Standards for Protection against the Dangers arising from Exposure to Ionising Radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom, Official Journal of the European Union L-13 of 17/01/2014, 2014

[5] IAEA, SSG-32, Protection of the Public against Exposure Indoors due to Radon and other Natural Sources of Radiation, IAEA, Vienna, 2015

Primary author: JANZEKOVIC, Helena (Slovenian Nuclear Safety Administration)

Presenter: JANZEKOVIC, Helena (Slovenian Nuclear Safety Administration)

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