Revision of the Euratom Basic Safety Standards for radiation protection and the impact for construction products

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Euratom Basic Safety Standards (BSS)

- The Council Directive 96/29/Euratom sets up a framework for the control of exposure of workers and members of the public to ionising radiation.
- Natural radiation sources are for the first time addressed explicitly (Title VII).
- Exposure to radon in dwellings is not included in the scope.
- No specific requirements for building materials containing natural radiation sources.

EC Recommendations

- **Commission Recommendation from 1990 on indoor exposure to radon (90/143/Euratom)**
- **Commission Recommendation from 2001 on radon in drinking water (2001/928/Euratom)**

EC Guidance Reports

- **Implementation of Title VII (RP 88)**
- **Reference levels for workplaces (RP 95)**
- **Principles for building materials (RP 112)**
  - Enhanced radioactivity of building materials (RP 96)
- **Exemption and clearance (RP 122 part II)**
- **Effluents and dose control from EU NORM industries (RP 135)**

- http://ec.europa.eu/energy/nuclear/radiation_protection/radiation_protection_en.htm

EC RP 112. Radiation protection principles for building materials

- **Gamma dose criterion for control is 0.3 – 1 mSv / year (in excess of outdoor gamma dose)**
- **Higher doses than 1 mSv / year should only be accepted in exceptional cases where materials are used locally.**
- **Exemption level: Building materials should be exempted if the gamma radiation increases the annual dose by 0.3 mSv at the most.**
- **Suggests an activity concentration index for identifying materials of concern**

Recasting procedure

- **Five directives become one:**
  - EU BSS directive (96/29/Euratom)
  - HASS directive (2003/122/Euratom)
  - Medical exposure directive (97/43/Euratom)
  - Outside workers directive (90/641/Euratom)
  - Public information directive (89/618/Euratom)
- **Work started 2006, several Working Parties:**
  - WP Natural Sources (NORM, radon, building materials)
- **Timetable for the new BSS directive:**
  - Text ready by end of 2009
  - Ready for Council late 2010
  - Council decision 2011/2012?
  - Implemented by Member States 2015?

Revision of Euratom BSS: Natural radiation sources

- **Review all articles that may be subject to (minor) revisions**
- **Binding requirements for**
  - NORM industries
  - Indoor radon
  - Building materials containing natural radiation sources
- **Criteria for clearance of materials**

EU BSS proposal

- **List of NORM industries which will require regulatory consideration:**
  - Extraction of rare earth from monazite
  - Production of thorium compounds and thorium containing products
  - Processing of niobium/tantalum ore
  - Oil and gas production
  - Geothermal energy production
  - TiO_2 pigment production
  - Thermal phosphorus production
  - Zircon and zirconia industry
  - Production of phosphate fertilisers
  - Cement production, maintenance of clinker ovens
  - Coal-fire power plants, maintenance of boilers
  - Phosphoric acid production
  - Primary iron production
  - Tin/Lead/Copper smelting
  - Ground water filtration facilities
- **Member States should be able to add activities which may require regulatory attention**

EU BSS proposal
Building materials (1)

- **Exposure from natural radiactivity in building materials – existing exposure situation**
- **Identify and list material of concern with regard to emitted gamma radiation**
- **Ensure that activity concentration index is determined and, if necessary determine doses**

EU BSS proposal
Building materials (2)

Activity concentration index (I)

- **For identified types of building materials, the activity concentrations of Ra-226, Th-232 (or its decay product Ra-228) and K-40 shall be determined.**
- **The activity concentration index I is given in the following formula:**

  $I = C_{Ra226}/300\ Bq/kg + C_{Th232}/200\ Bq/kg + C_{K40}/3000\ Bq/kg$

  where C_{Ra226}, C_{Th232} and C_{K40} are the activity concentrations in Bq/kg of the corresponding radionuclides in the building material.
- **The index directly relates to the gamma radiation dose, in excess to typical outdoor exposure, in a building constructed from a specified building material.**

EU BSS proposal
Building materials (3)

- **Indicative list of materials to take into consideration:**
  - Natural materials (alum-shale, building materials or additives from natural igneous origin such as granite, gneiss, porphories, syenite, basalt, tuff, pozzolana, lava)
  - Materials including by-products or residues from NORM industries such as fly ash, phosphogypsum, phosphorous slag, tin slag, copper slag, red mud (residue from aluminium production), residues from steel production

EU BSS proposal
Building materials (4)

- **Reference level of 1 mSv/y for indoor external exposure from building materials – in excess of the background outdoor external exposure**
- **Below the material is exempted and free to place on the market in EU**
- **Above the authority should consider appropriate control measures**
- **Information about the materials relevant for compliance with building codes should be available before placing on the market**

Public consultation on proposal regarding natural radiation sources

- **5 Feb 2009 – 20 April 2009**
- **47 contributions**
  - Governmental organisations/authorities (16)
  - Industry (15)
    From building materials industry:
    - European Brick and Tile Association
    - German Building Materials Association
  - Individuals (10)
  - RP associations or group of experts (5)
  - Environmental organisation (1)

Outcome in general

- **Consultation well received**
- **Demands for further public consultations on other parts of the Directive**
- **Positive to a harmonisation and strengthening of requirements for natural radiation sources**
- **High demand for guidance and information about rationale and implementation, e.g.**
  - Exemption levels or reference levels that correspond to different doses to the public
- **Demand for clear definitions**

Comments – Building Materials

- **Define building materials – including materials used for infrastructure constructions?**
- **Harmonisation and standards needed on how to measure and calculate radionuclide concentrations**
- **Concerns about possible stigmatisation of materials**
- **Concerns that the requirements are too flexible and may cause problems when shipping between MS**