



The provisions for NORM in the new European Basic Safety Standards

Åsa Wiklund

DG Transport and Energy

Radiation Protection Unit (H4)



Recasting procedure

- **Five Directives:**

- 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)

- **One Recommendation:**

- Commission Recommendation from 1990 on indoor exposure to radon (90/143/Euratom)



Timetable

- **Started in 2005/2006 when the article 31 Group of Experts set up specific Working Parties**
 - WP Natural Sources (NORM, radon, building materials)
- **Timetable for the new BSS Directive**
 - Text ready by end of 2009
 - Opinion of the art 31 GoE, impact assessment, interservice consultations, etc. Ready for Council late 2010
 - Council decision 2011/2012?
 - Implemented by Member States 2015?



News

- **Graded approach**
- **Deliberate exposure of humans for non-medical purposes**
- **Clearance levels**
- **Protection of the environment**
- **Specific requirements for natural radiation sources**
 - NORM / Radon / Building materials



European BSS Directive 96/29/Euratom

- **Natural radiation sources are for the first time addressed explicitly (Title VII)**
 - Identification of work activities of concern
 - Monitoring exposures resulting from such work activities
 - Vague formulations leaving large flexibility for Member States
- **Exposure to radon in dwellings is not included in the scope**
- **No specific requirements for building material containing natural radiation sources**



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



EU BSS proposal – NORM (1)

- **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
 - TiO₂ 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 can add activities which may require regulatory attention**



EU BSS proposal NORM (2)

- **NORM industries are regarded as planned exposure situations**
- **Graded approach**
 - Notification / Exemption levels
 - Registration or licensing
 - Licensing if exposures to workers are liable to exceed 6 mSv. Then all requirements for protection of workers apply.
- **Dilution not permitted in general but a possibility for NORM if authorised in specific cases.**



EU BSS proposal NORM (3)

- **Public exposure – dose constraint of 0.3 mSv**
- **Exemption levels and clearance levels for natural radiation sources**
 - 1 kBq/kg for U-238 and Th-238 series
 - 10 kBq/kg for K-40
 - Allowing for higher values for some elements in the decay chain, like Po-210 or Pb-210 (Community guidance)
 - Exclude recycling into building materials (1 mSv reference level)
 - *Working on wording about drinking water pathway and possibility for MS to set lower levels if DW pathway affected*



EU BSS proposal

Building materials (1)

- **Exposure from natural radioactivity 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:

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

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 for natural radiation sources

- **5 February 2009 – 20 April 2009**
- **47 contributions**
 - Governmental organisations/authorities (16)
 - Industry (15)
 - Steel producers
 - Zirconium chemical producers
 - Producers of abrasive products
 - Building materials and bricks and tiles industry
 - 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**
- **Yes to graded approach but more information needed about notification, registration and licensing**
- **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 - NORM

- **Additional industries suggested**
- **Notification for industries recycling into BM is questioned – how to implement and control?**
- **Why not use RP122 part II values?**
- **How assess doses to workers – health and safety equipment taken into account?**
- **Mixing with other material should be encouraged as it is day-to-day business. Re-check the term inert.**



Comments – Radon

- **Demand for technical guidance and European standards – especially for measurement techniques**
- **Demand for specification about number of rooms or floor level for measurements**
- **Take into account the occupancy when requiring measurements or not**
- **Why introduce a threshold for recording doses to workers? And why 400 Bq/m³?**



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**