

EC Progress regarding Building material and Radon risks

Euratom Basic Safety Standards

European Commission Radiation Protection

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BSS RECAST

- NORM EU REGULATORY FRAMEWORK
- ➢ ISSUES TO SOLVE
- RADON EU REGULATORY FRAMEWORK
- ISSUES TO SOLVE
- CONCLUSION





Several EU Directives were merged and consolidated:

- Basic Safety Standards (workers, general public): 1996
- Patients/Medical Directive: 1997
- Informing the public on measures in the event of a radiological emergency: 1989
- Outside Workers: 1990
- High Activity Sealed Sources: 2003





....Was a great opportunity to take on board natural radiation sources and especially:

- Planned exposure from new sources or new pathways of exposure resulting from:
 - Industrial activities processing naturally occurring radioactive materials (NORM)
 - ✓ operation of aircraft

Existing exposure:

- ✓ INDOOR RADON Recommendation 90/143/Euratom
- ✓ RP 112 (1999): Radiological protection principles concerning the natural radioactivity of building materials (gamma exposure derived from ²²⁶Ra, ²³²Th and ⁴⁰K)







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NORM EU REGULATORY FRAMEWORK

BSS. Art. 24: to identify "practices" defined as "any activity that involves the operation or introduction of radiation sources or which alters exposure pathways and is managed as a planned exposure situation".

NORM industries to be identified taking into account the **annex V**





extraction of rare earths from monazite;

production of thorium compounds and manufacture of thorium-containing products;

processing of niobium/tantalum ore;

oil and gas production;

geothermal energy production;

TiO₂ pigment production;

thermal phosphorus production;

zircon and zirconium industry;

production of phosphate fertilisers;

cement production, maintenance of clinker ovens; coal-fired power plants, maintenance of boilers;

phosphoric acid production;

primary iron production;

- tin/lead/copper smelting;
- ground water filtration facilities;
- mining of ores other than uranium ore.

ANNEX V









New BSS









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To provide for guidance (1/3)

$$I = C_{226_{Ra}}/300 + C_{232_{Th}}/200 + C_{40_K}/3000 \quad (C in Bq/kg)$$

EC mandated CEN under Council dir. 89/106/EEC of Dec. 1988 to help standardize and harmonize <u>*activity*</u> <u>*concentration measurement*</u> *and test standards.*

"TG 31"





DIFFICULTIES?











To provide for guidance (2/3)

	Categ	Categories	
Use	A ≤	B>1mSv	
	1mSv		
Bulk	I≤1	I>1	
materials			
(1)	Type A1	Туре В1	
Suparficial	ICC	T>6	
materials	120	1/0	
with	Type A2	Type B2	
restricted			
uses (2)			

75.3 "The competent authority shall ensure that identified types of building materials are classified in accordance with available CEN standards, on the basis of <u>their intended use</u> and <u>activity concentration index as laid down in Annex VII.</u>"





DIFFICULTIES?





Superficial materials with restricted uses





To provide for guidance (3/3)

75.4 "The competent authority shall define, in accordance with available <u>CEN standards</u>, protocols for the assessment of <u>expected doses</u> from indoor external exposure from specific types of building materials, in excess of prevailing outdoor external exposure"

CEN is also mandated by the EC to work on this issue:

"TG 32"



DIFFICULTIES?







Index and Radon ?

$I = C^{226}Ra / 300 + C^{232}Th / 200 + C^{40}K / 3000 < 1$

"²²⁶Ra concentration in the materials is limited, in practice, to a level which is unlikely to cause indoor radon concentrations exceeding: 200 Bq/m3"







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New BSS: Radon action plan (art. 103)

"Member States shall establish an <u>action plan</u> to manage long-term risks from radon exposures in dwellings, buildings with public access and workplaces for any source of radon ingress, whether from soil, building materials and water. The <u>action plan</u> shall take into account the issues specified set out in Annex XVI"







Radon action plan's content (New BSS Annex XVI)

- 1. <u>Surveys</u> and national radon database...
- 2. Criteria for the **identification** of radon-prone buildings
- **3.** <u>Identification</u> of types of buildings with public access and workplaces where measurements are needed
- 4. Establishment of **reference levels** for existing dwellings, workplaces, buildings with public access and for new buildings.
- 5. Assignment of national **responsibilities**, **coordination** mechanisms and available **resources** for implementation of the action plan.
- 6. <u>Strategy for reducing radon exposure</u> in dwellings, particularly in radon-prone areas.
- 7. <u>Strategy</u>, including methods and tools, <u>for preventing radon ingress</u> in new buildings, including identification of building materials with significant radon exhalation.







Radon action plan's content (New BSS Annex XVI)

- 8. Schedules for **audits and reviews** of the action plan.
- 9. Strategy for <u>communication</u> to increase public awareness and inform local decision makers of the risks of radon in relation to smoking.
- Where appropriate, <u>guidance</u> on methods and tools for <u>measurements</u> <u>and remedial actions</u>. Criteria for the accreditation of measurement and remediation services shall also be considered.
- 11. Where appropriate, **provision of financial support** for radon surveys and for remedial action, in particular for private dwellings with very high radon concentrations.
- 12. Establishment of **long-term goals** in terms of reducing lung cancer risk attributable to radon exposure (for smokers and non-smokers).





Art.37.1.c

"Radiological surveillance of the working environment shall comprise, where appropriate... the <u>measurement</u> of Radon concentrations in workplaces."









Radon in workplaces

Art. 53.1 (reference level)

The national reference level (NRL) not to exceed 1000 Bq/m³ at work

Art. 53.3 (optimisation)

Remedial action if the NRL is exceeded... (ALARA or NRL compliance?)

Art. 53.4 (if Radon > NRL)

All planned exposure requirements to be applied... And occupational dose < 20 mSV a year







Radon in dwellings and public buildings

Art. 74.1 NRLs shall not exceed: 200 Bq/m³ for <u>new dwellings</u> and public buildings 300 Bq/m³ for <u>existing dwellings</u> 300 Bq/m³ for <u>public buildings</u> or 1000 Bq/m³ if occupancy time is low.



Art. 74.2 (ALARA?)

If NRLs are exceeded then to encourage radon-reducing measures

Art. 74.3 (ALARA?)

Building codes to prevent Radon ingress from soil and building materials







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Issues?

"1000 Bq/m³ at work could be more than 6 mSv.a⁻¹ !?" "It depends on real occupancy time when working..." "Activity concentrations > 1000 Bq/m³ exist and should be tolerable as long as doses are minimized... ALARA..."

The new trend of discussions within the AQG is to consider only:

300 Bq/m³ for building as the max NRL and if compliance is not possible, **6 mSv.a⁻¹** ought to be the regulatory threshold above which worker classification should be compulsory and ALARA philosophy to be complied with for workers...







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CONCLUSION

- NORM will be taken on board by the new EU-BSS for:
 - Identified practices
 - Building materials
- Related pieces of guidance are to be drafted:
 - Activity concentration measurements (index)
 - > Building material typology $I \le 1$ or $I \le 6$ ("bulk" or "superficial")
 - > Dose modelling harmonisation for building materials
- Radon: 300 Bq/m³ in buildings X 6 mSv.a-1 X ALARA (action plan)





MERCI

