



EC - RADON Latest strategies and draft regulations

**European Commission
Radiation Protection**

**Participation in EARST WORKSHOP 2013,
International and National
RADON Regulations & Strategies**

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1990



Indoor exposure to radon, in existing EC regulatory framework, was very poor

- Exposure to radon in dwellings was not included in the scope of the existing EU Basic Safety Standards.
- Radon in workplaces was vague...
Title VII (Natural Radiation Sources) dealt only with an identification of "work activities" of concern...
- No specific requirements on building materials



1990



EC Recommendation on indoor exposure to radon (90/143/Euratom – 21/02/1990)

- Decisions should be made on annually-averaged radon measurements
- To ensure quality and reliability of annually-averaged measurements of Radon
- To develop criteria for identifying regions, sites and building characteristics likely to cause high indoor radon levels



1990



EC Recommendation on indoor exposure to radon (90/143/Euratom – 21/02/1990)

- Establish a system for reducing any exposure to indoor radon concentrations.
- Apply principle of optimisation
- To inform the population on the radon risk



1990



EC Recommendation on indoor exposure to radon (90/143/Euratom – 21/02/1990)

- Reference level for existing buildings
 - **400 Bq/m³** (equivalent to 20 mSv / year according to 90/143)
- Design level for the construction of new buildings
 - **200 Bq/m³**
- Remedial or preventive actions if reference levels are exceeded.

1997



EC Recommendations for the implementation of title VII of the EU BSS (RP 88 - 1997)

- Concentrate on highest exposures, and where actions are most likely to be effective.
- Surveys of radon exposure in different types of workplaces
- Action Levels for radon: 500 – 1000 Bq/m³
- When radon concentrations remain above the Action Level the principles of BSS should apply (controlled areas, monitoring and dose limits)
- Information and advice to employers on remedial actions

1999



EC radiological protection **principles** concerning the natural radioactivity of building materials (**RP 112 - 1999**)

- Calculation of the following index and industrial activities and notification to the regulatory authority when $I > 1$

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

- Radon exhalation: *"When gamma doses are limited to levels below 1mSv/y, the ^{226}Ra concentration in the materials is limited, in practice, to a level which is unlikely to cause indoor radon concentrations exceeding ... (200 Bq/m³)."*





BSS RECAST

5 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**

AND RADON RECOMMENDATION 90/143/EURATOM was added



BSS RECAST

This 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 (ingress from soil)*
 - ✓ *building materials and its index (gamma exposure and RADON EXHALATION)*



Radon in workplaces



Art. 33.2 (To take Radon on board)

"... where the exposure is liable to exceed an effective dose of 6 mSv per year or a corresponding time-integrated radon exposure value determined by the MS, these shall be treated as a planned exposure situation and the MS shall determine which requirements set out in "this" Chapter ("Occupational exposures") are appropriate.

For workplaces specified in article 53.3 and where the effective dose to workers is less than or equal to 6mSv per year or the exposure less than the corresponding time-integrated radon exposure value, the competent authority **shall require that exposures are kept under review.**"



Radon in workplaces



Art.37 (surveillance)

"Radiological surveillance of the workplace (RCA & RSA) comprises, where appropriate... the measurement of the activity concentration in air... The results... shall be recorded and shall be used, if necessary, for estimating individual doses..."

Art.41.4 (recording)

"Exposures... (to Radon) ... *shall be recorded separately...*"





Radon in workplaces



Art. 53.1 (reference level)

MS shall establish national reference level^S for indoor radon concentrations in workplaces $< 300 \text{ Bq/m}^3$ (unless it is warranted by national prevailing circumstances).

Art. 53.2 (measurement)

Radon measurement at ground floor or at basement level for identified workplaces

Art. 53.3 (notification & regulatory actions)

Despite remedial action if the NRL continues to be exceeded then "notification" + occupational exposure measures...



Radon in dwellings and public buildings

Art. 74.1

*NRLs shall not exceed:
300 Bq/m³*

Art. 74.2

*MS shall promote action **to identify dwellings** with high Radon concentration (as an annual average) exceeding the reference level and encourage, where appropriate, by technical or financial means, radon concentration-reducing measures in these dwellings.*

Art. 74.3

...local and national information to be made available...



New BSS: Radon action plan (art. 103)

“...Member States shall establish a [national action plan](#) to addressing 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 [action plan](#) shall take into account the issues specified set out in Annex XVI...”



Radon action plan list of items to be considered... (New BSS Annex XVI)

1. Surveys to estimate indoor radon distribution...
2. Criteria to establish priorities
3. Identification of types of workplaces & buildings with public access where measurements are required (with risk assessment).
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.



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

- 6. Strategy for reducing radon exposure** in dwellings taking into account criteria (2) for giving priorities...
- 7. Strategies for facilitating post construction remedial action.**
- 8. Strategy**, including methods and tools, **for preventing radon ingress** in new buildings, including identification of building materials with significant radon exhalation.
9. Schedules for **reviews** of the action plan.
- 10. Strategy for communication** to increase public awareness and inform local decision makers, employers and employees of the risks of radon, including in relation to smoking.



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

11. **Guidance** on methods and tools for **measurements and remedial actions**. Criteria for the accreditation of measurement and remediation services shall also be considered.
12. Where appropriate, **provision of financial support** for radon surveys and for remedial measures, in particular for private dwellings with very high radon concentrations.
13. **Long-term goals** in terms of reducing lung cancer risk attributable to radon exposure (for smokers and non-smokers).
14. Where appropriate, consideration of other related issues and corresponding programmes such as programmes on energy saving and indoor air quality.

CONCLUSION

1/ National action plan

2/ For all buildings, constructions and workplaces, Max RL shall be 300 Bq/m³

Flexibility was kept to establish different lower limits at national level

CONCLUSION

**3/ At work, if 300 Bq/m³ max is not possible then:
6 mSv.a⁻¹ shall be the regulatory threshold above which
specific occupational exposure regulations should apply.**

NB: according to the latest ICRP data:

400 Bq/m³ (annual average and 2000h of exposure): 10,4 mSv

300 Bq/m³ (annual average and 2000h of exposure): 8 mSv

225 Bq/m³ (annual average and 2000h of exposure): 6 mSv

**4/ Many EU harmonized standards may have to be
drafted after the EU BSS publication...**

Thank you

