



Common understanding and recommendations related of the BSS requirements on radon in workplaces

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Background

Radon is a proven lung carcinogen for humans (classified in group 1 in the IARC classification). Recent epidemiological findings from residential studies demonstrate a statistically significant increase of lung cancer risk from prolonged exposure to indoor radon at low level of exposure. In many countries, exposure to radon is, before medical exposure, the primary source of exposure to ionising radiation.

For several years, in many European countries, national authorities have promoted actions for measuring indoor radon concentration and reducing radon exposure in dwellings, buildings with public access and other workplaces. Many advances have been carried out for the development of measurement methods, the knowledge of population exposure or the radon civil engineering.

The Council directive 13/59/Euratom laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation (European BSS) introduces the new concept of National Radon Action Plan for 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 or water. Specific requirements deal with radon in workplaces.

A 1st radon workshop dedicated to National Radon Action Plan has been organised in Montrouge (France), 30 September-2 October 2014, by NRPA (Norway) and ASN (France); the final report is available on NRPA and ASN websites.

At the 14th HERCA meeting (Oct. 2014) , on the basis of this workshop's main findings, it has been decided to organise a 2nd workshop to deepen BSS requirements dedicated to radon in workplaces, including radon in buildings with public access and radon produced by materials in NORM activities, in order to facilitate the transposition works. Consequently, ASN and NRPA decided to collaborate with FOPH (Switzerland) in the organisation of this second workshop. Relevant international organizations such as WHO, IAEA, ILO and ICRP also participated in this workshop.

Common understanding of the BSS requirements and Recommendations

The Council directive 2013/59/Euratom laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation (BSS) introduces the new concept of national action plan for reducing radon exposure. The radon exposures in workplaces and buildings with public access have to be considered in the national radon action plan.

On the basis of the analysis of the BSS requirements, HERCA members:

- Propose a common understanding of these requirements in order to bring clarification when it seems to be necessary and useful,
- And nevertheless, taking into account the flexibility introduced in the BSS, formulate 15 recommendations in order to support the preparation or the updating of the national action plans, and associated regulations.

Common understanding of BSS requirements

- For the national action plan preparation, Member States should consider the indicative list of items defined in the BSS, annex XVIII. This list is not exhaustive, and Member States may include further topics.
- The actions included in the national radon action plan (Article 103), in particular those under the responsibility of a national authority, should allow for the principle of justification applied to existing exposure situations in general (Article 100.2). Also, any decisions on remedial action in a specific workplace should be justified, in the sense that it should do “more good than harm” (BSS Article 5 (a)).
- The responsibility for the establishment and implementation of the national radon action plan is assigned by the Government/Regulator. This relates in particular to the introduction of the national reference level value(s), the identification of areas mentioned in BSS, annex XVIII item 2¹, and requirements on workplaces located in these areas on the ground floor or basement level, as well as to the identification of specific types of workplaces of interest (inside or outside these areas, taking into account parameters listed in the national radon action plan). Such decisions can be introduced in the national radon action plan and/or in specific regulations.
- The identification of specific types of workplaces and buildings with public access should be achieved on the basis of a risk assessment, considering for instance occupancy hours, building type, location (geology), etc.
- Radon in workplaces that may arise from the presence of naturally occurring radioactive materials (NORM) that are considered within a planned exposure situation is not covered by the national radon action plan. The identification of individual industrial sectors or processes, taking into account sectors listed in Annex VI of the BSS, should be organised in parallel.
- In ordinary workplaces and workplaces such as mines, caves, spas (not considered as practices), for which there is no link between the type of work and the exposure to radon, radon measurements and remedial actions should be placed under the employer’s responsibility.
- For NORM practices (as for all practices), the first responsibility for the protection of workers exposed to radon should be clearly allocated to the undertaking or the employer (BSS Article 31.1/31.2).
- In addition to the employer’s responsibility, particularly in the context of rented buildings, the building owner’s role, for new-built possibly in conjunction with the construction company, can be considered.
- The term “new buildings”, introduced in BSS Article 103(2)), and for which appropriate measures have to be in place to prevent radon ingress, includes the ordinary workplaces, with or without public accesses, but excludes underground workplaces.
- The reference level for radon exposure in workplaces (considered as an existing exposure situation), as defined in BSS Article 7, is not considered as a limit but as a tool for optimisation. As a principle, it will be applied as follows: above this level, the employer or the undertaking has to take justified measures for reducing the radon concentration. The optimisation principle continues to apply also below the reference level that means that the

¹ Different terminologies are used for the designation of these areas: for instance, “radon prone areas”, “priority areas”...

employer needs to consider taking measures to reduce exposures also below the reference level.

The reference level for the annual average activity concentration in air shall not be higher than 300 Bq/m³. A Member State may choose a higher reference level if it is warranted by national prevailing circumstances (BSS Article 54.1). The same reference level is meant to apply to all workplace types even though in some types of workplaces it may not be possible to reduce the radon concentration so as to be below the reference level.

- Occupational exposure to radon in workplaces requires a notification in those situations where the radon concentration continues to exceed the national reference level, after optimisation (BSS article 54.3 in conjunction with article 25.2).
- Where the radon concentration (as an annual average) continues to exceed the national reference level, after optimisation, in a situation where the exposure of workers is liable to exceed an effective dose of 6 mSv per year (or a corresponding time-integrated radon exposure value), the radon exposure at work needs to be managed in the same way as a planned exposure situation. The Member States determine which requirements set out for occupational exposure are appropriate (BSS, Article 35.2).
- The calculation of the annual dose in general does not take into account the radon dose, except if a notification is required for occupational exposure to radon under article 54.3, and except for NORM practices which are not exempted from notification and for which radon exhaling from NORM materials may be a pathway that needs to be considered.
- For NORM practices, the dose calculation needs to take into account all the exposure pathways: external exposure due to gamma radiation, internal contamination by inhalation or ingestion of (dust) particles, and inhalation of radon and thoron decay products exhaled from the material.

Recommendations

(National Action plan, justification and responsibilities and risk communication)

Rec. I.

Radon exposure, including exposures of workers during all their professional and domestic life, is a public and occupational health issue. The implementation of the national action plan has the potential to save lives and should therefore be given an important priority by Member States. The long-term goal is a reduction of lung cancer risk.

Rec. II.

The national action plan for radon should aim to:

- reduce the individual lung cancer risk by reducing high radon exposures;
- reduce the overall lung cancer risk by reducing the average radon concentrations to well below the reference level.

Rec III.

The national action plan should include preventive and educative actions developed for all employees, involving stakeholders such as Labour Unions and Employers Associations. To allow the effective performance of radon measurements and remedial actions as well as better overall supervision and monitoring, a clear responsibility assignment for radon control in workplaces should be addressed.

Rec. IV.

While in general radon mitigation strategies in the national action plan may include both voluntary and mandatory approaches, HERCA supports the regulatory approach for radon measurement and mitigation in workplaces, including those in buildings with public access.

Rec. V.

Radon risk communication is a key aspect of any radon action plan. As a part of the action plan, customized information should be prepared for employers, employees and their representatives, and other stakeholders. Appropriate communication channels should be used, with particular attention given to small and medium-sized enterprises.

Rec. VI.

Mechanisms for worker participation in managing radon risk should be encouraged.

Rec. VII.

HERCA draws national authorities' attention to the radon risk management in workplaces with public access, particularly on the issue of risk communication. In a situation where the radon concentration remains above the reference level, even after optimization, risk communication should cover both the public and workers' exposures. The communication should allow for the difference between the regulatory frameworks (existing exposure situation without dose limitation on the one hand and an existing exposure situation deliberately managed as a planned exposure situation under certain circumstances, with dose calculation, on the other hand). The elements for risk communication toward the workers and the public should be generally prepared in advance, particularly in schools and kindergartens.

Recommendations

(Identification of workplaces, radon measurements and control)

Rec. VIII.

Since the radon measurement results are meant to be representative of the annual average activity concentration in air, HERCA recommends to carry out measurements of radon activity concentrations according to national protocols, taking into account international standards, considering for example the relevant ISO standards².

Rec. IX.

HERCA strongly recommends that radon measurement in workplaces, in the case where these measurements are mandatory, should have to be carried out by bodies recognized by national authorities. The qualification and training of bodies in charge of remedial actions should also be considered.

For these radon measurements, HERCA recommends to collect and use the results as a tool to assess the impact of the regulations and/or the national strategy put in place and to evaluate the national action plan. HERCA suggests to explore opportunities to collect this results in a database.

Rec. X.

² EN ISO 11665-1 to EN ISO 11665-8 and EN ISO 13164-1 to EN ISO 13164-3.

The regulatory procedure should define appropriate time schedules for the implementation of the requirements related to measurement, notification and optimisation.

Rec. XI.

HERCA considers that a regular assessment of the implementation of the regulation related to radon in workplaces and buildings with public access has to be carried out. This assessment should be integrated into other issues related to health and safety at the workplace. Relevant inspectors' training with regard to the concerns about radon has to be ensured.

Recommendations

(Graded approach for radon exposure in workplaces)³

Rec. XII

HERCA recommends the use of international guidelines, and associated tools, to calculate annual effective doses from the time integrated radon concentration, for different situations such as mines, caves, spas as well as ordinary workplaces and NORM activities. HERCA should ask the European Commission, with reference to the procedure described in the BSS (recitals (9) and (11)), to put this issue on the agenda of article 31 Experts Group as soon as possible.

Rec. XIII.

In order to verify whether the dose limit is complied with, since the duration of exposure should be taken into account in the evaluation of the effective dose or of the corresponding time-integrated radon exposure, HERCA recommends to define, at national level, in which situations a recording of the individual exposure times is necessary.

Rec. XIV.

In case of doses exceeding 6 mSv per year or a corresponding time-integrated radon exposure, requirements set out for occupational exposure need to be laid down; HERCA recommends to apply the occupational exposure requirements related to optimisation, to the radiological surveillance of workplaces (adapted to radon exposure), to workers' information and, in some cases, to individual monitoring.

Information should be given to occupational health services in order to allow them to inform workers of the specific radon risk, in particular in combination with smoking. To facilitate the workers' information, employers should ensure that there is sufficient internal expertise on radon, or that external expertise can be called upon.

Rec. XV.

To facilitate the implementation of the BSS requirements on radon in workplaces, HERCA should ask the European Commission to prepare European Guidance (to be published in the Radiation Protection Series) based on good practices. Taking into account the different types of concerned workplaces, this guidance should focus on the identification of workplace types, on measurements protocols and on adequate approaches to optimisation.

³ A flow chart should be useful for people who are not familiar with radiation protection terminology and concepts.

