EU-RAP

Ref. Ares (2020)2496502

sck cen
Belgian Nuclear Research Centre

merience
Strategic thinking

SÚRO

Radon Action Plans in European Member States and the UK

Dealing with Radon Risk on Workplaces

NORM X symposium & RICOMET conference, Utrecht, the Netherlands on May 9 – 13, 2022

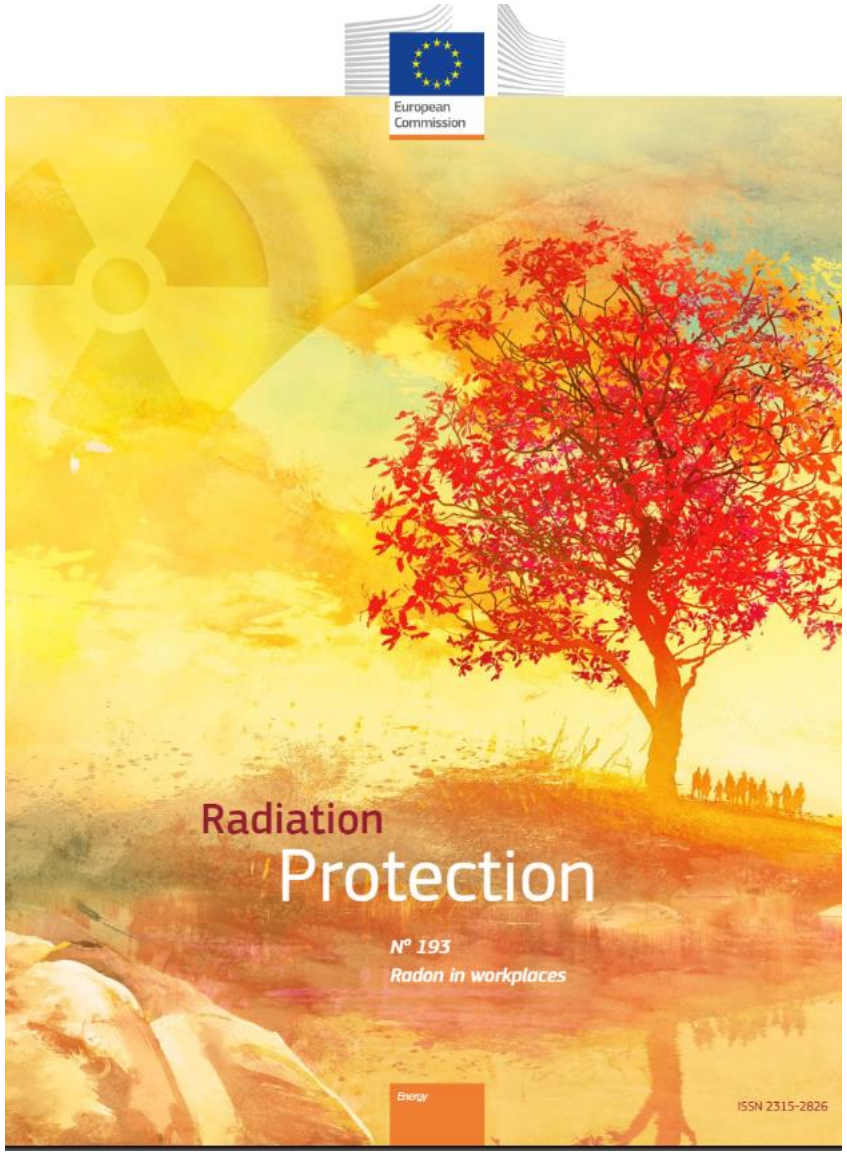
Kateřina Navrátilová Rovenská, SURO

Ivana Fojtíková, Meritxell Martell, Tanja Perko, Robbe Geysmans & Johan Paridaens

The EU-RAP study: "*Review and evaluation of national radon action plans established in EU Member States according to the requirements in Council Directive 2013/59/Euratom –the BSS Directive – focusing on the practical implementation of the actions defined in these action plans"* receives support by EC, DG Energy. Ref. Ares (2020)2496502

EU-RAP

Ref. Ares (2020)2496502



Introduction

Radon in the workplace:

Exposure to indoor radon constitutes an important part of the overall exposure to ionising radiation of workers, particularly in certain geographical areas or specific types of workplaces.

EC established a uniform basic safety standards to protect health of workers against dangers arising from radon, recognising the importance of occupational radiation protection as a priority objective.

Legal background: Council Directive 96/29/Euratom [EU1996] already included general requirements on the identification of work activities where workers could be exposed to thoron or radon, explicitly mentioning spas, caves, mines, underground workplaces and aboveground workplaces in identified areas.

Council Directive 2013/59/Euratom confirms the required high level of protection of the previous Directive, extending its scope to coherently and consistently cover the protection of workers in workplaces with enhanced natural radiation, e.g. workers exposed to radon in workplaces, workers in industries processing naturally-occurring radioactive materials (NORM), as well as aircrew and space crew.

Status of radon action plans in EU MS and the UK (May, 2022)

EU-RAP
Ref. Ares (2020)2496502

By May 2022:

- RAP approved in 23 countries
- 'Draft document' in 3 countries (ES, IT, PT)
- No dedicated RAP in 2 countries (but radon actions are taken) (LI, LT)

EU-RAP

Ref. Ares (2020)2496502

Focus

BSS Directive Article 54 Radon in workplaces – MS shall:

- establish national reference levels for indoor radon concentrations in workplaces
- require that radon measurements are carried out in workplaces within the identified areas
- require that radon measurements are carried out in specific types of workplaces
- require notification of situations where the radon concentrations continues to exceed the reference level despite of optimized measures applied

Task 1. Collection of RAPs, authorities' **identification and relationship**

Document analysis
Internet search
Snowball technique
Email
Phone calls
Participation in radon-related events

Task 2. **Analysis** of national RAPs

On-line survey
Group- interviews

Task 3. **Comparative** horizontal analysis

Comparative analysis
4 regional workshops

Accession countries*

Task 4. Final **workshop**

Participatory workshop

Review and evaluation of national RAP established in EU MS and the UK according to the requirements in the BSS Directive – focusing on the practical implementation of the actions defined in these action plans

EU-RAP Reference Group

Management and quality control

Council Directive 2013/59/Euratom – the BSS Directive

Reduce lung cancer risk

EU-RAP

Ref. Ares (2020)2496502

Reference level

- Reference level workplaces
  - 100 Bq/m^3 Netherlands, Denmark
  - 200 Bq/m^3 Sweden
  - 300 Bq/m^3 the rest
  - 400 Bq/m^3 Latvia
  - 600 Bq/m^3 Spain

- Reference level public buildings, schools and kindergartens
  - Mostly the same reference level value as for workplaces
  - 200 Bq/m^3 Estonia, Ireland
  - 300 Bq/m^3 Spain

- Basis for the reference level is most often the prevailing geological situation and the upper level of radon concentration recommended by the EU BSS.

EU-RAP

Ref. Ares (2020)2496502

Effective dose calculation

- ICRP 137 implemented in several MS
  - Spain to be implemented this year
- ICRP 65
  - UK, Germany, Latvia, Slovenia, Portugal (ICRP137 under discussion)
- ICRP 115+126
  - Sweden

- Pending task for decision – France, the Netherlands, Portugal
- Dose conversion factors not implemented in the legislation
  - Croatia, Slovakia, Poland
  - Malta, Cyprus (no need, low radon conc.)

- Some MS also use time integral of radon activity concentration for comparison if the effective dose or reference level is exceeded (e.g. Sweden)

EU-RAP
Ref. Ares (2020)2496502

Types of workplaces

- All workplaces to be measured
  - With priority given to those located on priority areas - Sweden, UK, Portugal
  - Employer is responsible for assessment of the health risks for employees incl. radon – France, Denmark
- Specific workplaces
  - To be measured regardless their location
  - Most MS consider water treatment facilities and underground workplaces (mines, caves)
  - but also spas, jails, wineries are considered as workplaces to be measured
  - Several MS consider buildings of public interest and school and preschool facilities
  - or geology defined locations – all territory with well permeable gravel or sandy soil (Finland)
- Workplaces on priority areas
  - Connected with delineation of priority areas, located in basement and on ground floor in these areas
  - Some MS have not finished delineation of priority areas -> measurement is on voluntary basis
  - Some MS define using additional criteria, e.g. buildings built before implementation of legal framework considering radon (Czech Republic, Slovakia)
- Exemption from notification
  - time spent at workplace – 10-100 h per year

EU-RAP
Ref. Ares (2020)2496502

National measurement protocol for indoor radon

- In most of the MS measurement protocols are developed
- Poland has published good practices
- Cyprus and Malta have decided not to develop measurement protocol due to prevailing low radon concentration on the territory

- Passive integral detectors are widely used, measurement duration ranges from 1 up to 12 months
- Continuous monitors are used as well, but not quite often

EU-RAP
Ref. Ares (2020)2496502

Licensing of measurement providers

- Some MS define national criteria which should be fulfilled by the measurement body (laboratory, company), e.g. Czech Republic, Sweden
- Some MS require accreditation according to ISO/IEC 17025
- In few MS the licensing/accreditation/registration of measurement provides is foreseen in near future, e.g. Greece, Hungary

- Compare: Licensing/accreditation of providers of mitigations is often ‘decided not to establish’ or ‘providers listed after undertaking a training course’.

EU-RAP
Ref. Ares (2020)2496502

Mitigation guidelines

- Builders, architects and engineers recognized as important counterpart in reducing radon levels indoors.
- Status of development and extent of mitigation guides is influenced by the importance given to radon in past 20 years.
- Guidelines comprise the description of good practices up to technical standard and implementation of radon related requirements in building code.
- Few MS requests considering radon during renovation of buildings (e.g. Finland)
- Subsidies if available for mitigation directed to households and public buildings, only France reported possible financial support for employers.

EU-RAP

Ref. Ares (2020)2496502

Actions if elevated radon levels found

- Standard procedure:
  - the employer is required to take corrective action to reduce radon concentration below the reference level;
  - if after implementation of the corrective action the concentration remains above the RL, the employer should follow the notification procedure;
  - annual effective dose is <=6 mSv, the employer is responsible to follow procedures for monitoring employee and informing the regulator;
  - annual effective dose >6 mSv shall be treated as planned exposure situations.

- MS differ in:
  - the extent of support provided to the employer
    - e.g. Lithuania or Hungary with the case by case support provided by the regulator and the UK or Sweden with established regulatory system and system of guidelines and private companies providing measurement and mitigations);
  - the extent of measurement if the reference level is exceeded
    - e.g. Slovenia recommend to carry out measurement of radon progenies and gamma dose rate of building material;
  - the obligation to the employer to carry out measurement after implementing remedial measure
    - e.g. Croatia with no obligatory measurement and the Czech Republic where the confirmation of reduction is carried out as an annual measurement and dose calculation.

EU-RAP
Ref. Ares (2020)2496502

Working from home

- Most of the MS do not take special actions regarding working from home.
- Some countries sensitised this potential exposure through mass media during Covid-19 lock-down. (e.g. Belgium)
- UK: work with radiation (according to legislation): it does not matter where your work is.

FANC Samen beschermen
federaal agentschap voor nucleaire controle

Persbericht

Brussel, 30 september 2021

Radonactie 2021

Luchtkwaliteit speelt beslissende rol in onze gezondheid

Daar is de herfst weer en dus ook de Radoncampagne van het Federaal Agentschap voor Nucleaire Controle (FANC), in samenwerking met de Waalse provincies, het Brussels Hoofdstedelijk Gewest en de Duitstalige Gemeenschap. Met de jaarlijkse campagne wil het FANC de bevolking informeren over de risico's van radon, maar ook over de screeningmogelijkheden en preventie- en saneringsmaatregelen. Radon is een radioactief gas dat afkomstig is uit de ondergrond en kan binnendringen in gebouwen. Een goede luchtkwaliteit in huis is essentieel voor de gezondheid van de bewoners en aangezien een gebrek aan ventilatie, vooral tijdens de koude herfst- en wintermaanden, ervoor zorgt dat de hoeveelheid radon zich opstapelt, is het in deze periode van het jaar een bijzonder aandachtspunt, zeker nu mensen meer tijd thuis doorbrengen als gevolg van de coronacrisis en de toename van telewerk.

Radon is een radioactief gas dat van nature in de bodem en in gesteenten voorkomt. Het is kleurloos, geurloos en smaakloos, waardoor het een onzichtbaar maar reëel risico vormt. Het gas kan namelijk vanuit de kelderverdieping gebouwen binnendringen via scheuren in vloeren en muren, via sanitaire leidingen en verwarmingsbuizen, enzovoort. Radon inademen kan gezondheidsproblemen veroorzaken. Na tabak is radon de meest voorkomende oorzaak van longkanker in België. In de openlucht wordt radon snel verdund, maar in gesloten, slecht verluchte ruimten kan het zich na verloop van tijd opstapelen.

Hoe kan je de hoeveelheid radon in huis meten?

De enige betrouwbare manier om te weten of je aan radon bent blootgesteld, is het gebruik van een detector. Dat is een klein plastic kokertje dat je gedurende drie maanden in je huis laat staan, in de drukste kamer op de begane grond, in veel gevallen de woonkamer. Na die periode stuur je de detector terug voor analyse en ontvang je vervolgens de resultaten.

Hoe weet je of je in een radonrisicogebied woont?

EU-RAP
Ref. Ares (2020)2496502

Conclusions

Dealing with radon risk on workplaces

- There is a legal basis established to protect workers from radon.
- Measurement at workplaces are/will be implemented in MS.
- Many specific workplaces are still to be measured regardless of the location defined in all of the MS.
- Workplaces located in priority areas are/will be defined as well; measurement on voluntary basis where priority areas not delineated yet.
- Funding mostly not provided to private companies; in few MS provided to school facilities and/or public buildings.
- Measurement protocols are/will be developed for workplaces in most of the MS.
- There is a lack of education & training related to protection from radon risk for employers and employees in most of the EU MS.

EU-RAP

Ref. Ares (2020)2496502

sck cen
Belgian Nuclear Research Centre

merience
Strategic thinking

SÚRO

THANK YOU!

katerina.rovenska@suro.cz
meritxell.martell@merience.eu
tperko@sckcen.be
ivana.fojtikova@suro.cz
johan.paridaens@sckcen.be
rgeysman@sckcen.be

The EU-RAP study: "*Review and evaluation of national radon action plans established in EU Member States according to the requirements in Council Directive 2013/59/Euratom –the BSS Directive – focusing on the practical implementation of the actions defined in these action plans"* receives support by EC, DG Energy. Ref. Ares (2020)2496502