Why a Survey on radon?

National regulations for the protection against radon at the workplace have recently evolved in Europe. In general, the number of workplaces affected by the regulations has increased; including many workplaces not previously aware of the radiation protection system. Furthermore, the practical application of the regulation for radon, using a step-by-step approaches, with reference level/exposure values, might be challenging in practice. It can raise questions from employers and other affected parties and communication might be an issue.

As a consequence, the European ALARA Network has set up, in 2021, a working group to investigate the practical implementation of the ALARA principle in relation to exposure from Radon At the Workplace (A-RAW).

The objective

The objective of the working group is to collate a sample of practical experiences in Europe (1~2 case studies per country), detailing the controls and measures implemented to protect against radon exposure in the workplace.

A set of questions to assist the description of suitable case studies is proposed (cf. below). It focuses on the steps taken to identify and manage workplaces with regard to radon.

The Working Group aims to synthesize the experiences collected from the field

1. Commonalities and differences
2. Lessons-learned,
3. good practices and difficulties in application.

These information can be useful to discuss the application of ALARA principle in these situations, address potential gaps and identify if actions (ex. guidance) are needed in the future and by who.

The Working Group aims to share these results to the concerned radiation protection community and will work on identifying opportunities to do so.
SET OF QUESTIONS.

1 survey = 1 case study of your choice (workplace concerned with regulation on radon: touristic cave, underground workplace, bakery, robot factory …)

The check box (☐; ✓) are used to have a quick view of the national regulation. The text inbox host experience from the practical case study.

<table>
<thead>
<tr>
<th>ALARA FOR RADON AT WORK TEMPLATE FOR CASE STUDY</th>
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<tbody>
<tr>
<td>Could you please provide a short description of the case study and the workplace?</td>
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<tr>
<td>Context, sitting, number of workers etc.</td>
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<td>…</td>
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# IDENTIFICATION OF WORKPLACES

Context: Radon measurements shall be carried out in identified workplaces

- What are the criteria to select the workplaces?
  - Workplace in basement
  - Workplace in ground floor
  - Map or radon-prone area
  - Specific workplace
  - former radon measurement
  - other: …
- Using the criteria: ☐ Mandatory ☐ Not mandatory

What are your views about the system for the identification of workplaces? And what happens to all the other workplaces?

…

# RADON CONCENTRATION MEASUREMENT

Context: Radon measurement protocol.

- Normative protocol for radon concentration measurement: ☐ Mandatory ☐ Not mandatory
- Preference given to ☐ passive or ☐ direct-reading measurement devices?
- Accredited/certified services for radon concentration measurements: ☐ Mandatory ☐ Not mandatory
- Are provisions for verification measurement provided in law? ☐ Yes ☐ No

What are your views about the protocol for radon concentration measurement?

Issues in practicality, cost, information to the workers and/or Health and Safety

…

What if < reference level? Any (mandatory) requirements to reduce exposure ALARA?

…

# DIAGNOSIS AND REMEDIATION

Context: If > reference level, remedial action to reduce radon concentration shall be taken.

- Who is responsible? ☐ Employer ☐ Property Owner
- Are accredited/certified services for radon concentration measurements mandatory? ☐ Mandatory ☐ Not mandatory
- Are guidance available to help establish a diagnosis of the building and inform the type of mitigation required? ☐ Yes ☐ No
  - Ex. Guidance on best practices, definition of standards for corrective measures (technical, organizational, cost) and their long-term follow-up.
- Is it needed? ☐ Yes ☐ No
- Time frame for remediation actions? … (years)
- Time frame for remediation follow-up measurement? … (years)
### GOING FURTHER
Context: Remedial action were not sufficient.

- Is the optimization principle considered in the implementation of the remedial action? □ Yes  □ No
  
- Cost-efficacy consideration, numerical target, involvement of workers, ...

### # CASE WHERE EFFECTIVE DOSE < 6 mSv

- Is it clear how to notify the situation to the competent authority? □ Yes  □ No

- Is the exposure assessment always requested? □ Yes  □ No

- Who can perform the exposure assessment □ Employer □ Property Owner □ In-house Radiation Protection Expert □ External Radiation Protection Expert

- Are data/guidance available for the determination of annual radon concentration and "theoretical" estimate of effective dose to workers? □ Yes  □ No

Ex. calculation techniques for estimating the radon concentration average and effective dose: respiratory/breathing rate, time in contact with radon, which conversion factors do you use, equilibrium factor etc.

- Is it needed? □ Yes  □ No

What are your views about the exposure assessment process?

### # CASE WHERE EFFECTIVE DOSE ≥ 6 mSv

- Who is responsible for implementing the requirements? □ Employer □ Property Owner □ In-house Radiation Protection Expert □ External Radiation Protection Expert

- Are there practical difficulties in?
  - The identification of radon prone area (zoning) ......................... □ Yes  □ No
  - Signage or warning system .......................................................... □ Yes  □ No
  - Ventilation/airflow requirements? And checks on continued operation of radon countermeasures (fans/sumps)? ....................... □ Yes  □ No
  - Control of exposure of workers .................................................. □ Yes  □ No
  - Provision to “promote the development of an appropriate radiation protection culture” by the workers .......................... □ Yes  □ No
  - Re-measurement/re-assessment ................................................... □ Yes  □ No
  - Other: ...

Any details you would like to report?

### CASE WHERE EFFECTIVE DOSE ≥ 6 mSv

- Who is responsible for the implementation of licencing requirements for the workers? □ Employer □ Property Owner

- Are there practical difficulties in?
  - Individual radiological surveillance: dosimetry system (calculation hypothesis, EAP, personal dosimeter (incl. market analysis) against ambient measurement, etc.) ................................................ □ Yes  □ No
  - Categorization of workers? ......................................................... □ Yes  □ No
### Recording and reporting of result (dose register) and access to the results?

- Yes ☐  No ☐

### Protection of outside workers?

- Yes ☐  No ☐

### How do employers access/obtain advice from a radiation protection expert and training and education in radon?

- Yes ☐  No ☐

### Other:

- Any details you would like to report?

- ... 

### Are there practical difficulties for workplaces combining radon + other exposure from planned situation? (radiological surveillance, dose limit, ...)

- ... 

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