

Radon in Workplaces A New IAEA Safety Guide

DS519 Safety Guide for the Protection of Workers Against Exposure Due to Radon

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IAEA SAFETY STANDARDS
for protecting people and the environment

Status: Step 8 Soliciting comments by Member States
Review Committee: RASSC

Protection of Workers Against
Exposure
Due to Radon

DRAFT SAFETY GUIDE
No. DS519
New Safety Guide

 **IAEA**
International Atomic Energy Agency

Content

- Overview of DS519
- Challenges
- Implications for Australia
- Comments

DS519 Background

- IAEA RASSC agreed to develop guidance on radon
- Member States provided members for drafting group
 - Olga German – IAEA
 - Valeria Gruber – Austria
 - Haruyuki Ogino – Japan
 - Jeff Whyte - Canada
 - Jim Hondros – Australia
 - Michael Gaunt – UK, ILO representative
- Commenced drafting in Jan 2020
- Draft to IAEA RASSC in mid 2021
- Draft released for comments by Member States by 31 March 2022.
- Occupational exposure only.
- Advice on radon dose factor(s) not part of the scope of this work.

Sensitive Document

- Many countries asking for advice on radon
- Natural very large variation in concentrations
- Mixed understanding (Rn vs. RnDP)
- Based on IAEA GSR Part 3 (implementation varies around the world)
- Different regulated “reference levels” for radon around the world.
- Lack of international agreement on radon dose factors
- Talks about applying radiation controls in “non radiation” workplaces
- May lead to increasing complexity (in a time of reducing practical expertise)

Objective and Scope

Objective

- Provide **practical guidance** on how to address protection in workplaces affected by radon in **planned and existing** exposure situations.

Scope

- Guidance on **regulatory control and management of exposure** due to radon at workplaces and some limited guidance on thoron;
- Addresses the **responsibilities** of the government, regulatory body or other competent authorities, employers, licensees and/or registrants, workers and service providers, for protection of workers exposed to radon in existing and planned exposure situations;
- **All types of workplace** including workplaces in above ground buildings, underground workplaces and industries involving naturally occurring radioactive material where occupational exposure to radon might occur;
- **Protection of the public** entering workplaces with radon exposure is also addressed.

Main Sections

- Based on the requirements in GSR Part 3
- Overview of approaches for protection of workers
- Framework for protection of workers against exposure to radon in;
 - Existing exposure situations
 - Planned exposure situations
- Aspects for;
 - Government
 - Regulatory body or other competent authority
 - Employer
- Occupational exposure to thoron
- Annex 1: Radon Measurements Protocols and Measurement Techniques
- Annex 2: General Methodology for Radon Related Dose Assessment

Challenges

- Application in Planned and Existing Exposure Situations
- Application at the boundary between Planned and Existing
- Where is the guide applicable ?

Planned/Existing

- Planned Exposure Situations:
 - Situations where radiation protection can be planned in advance, before exposures occur and where the magnitude and extent of exposures can be reasonably predicted.
- Existing Exposure Situations:
 - These are exposure situations that already exist when a decision on control has to be taken, including prolonged exposure situations after emergencies
 - Also includes exposure to natural background radiation.

Planned/Existing Requirements

- Planned exposure situations
 - Workplace/personal monitoring
 - Convert workplace exposures to dose
 - Add dose from other exposure pathways
 - Compare to dose limit
 - Advice on controls
- Existing exposure situation
 - Assess radon concentrations
 - Compare to reference levels
 - Optimisation or dose assessment

Exposure Situation Requirements

Aspect	Existing Exposure Situation	Planned Exposure Situation
Compliance level	Reference level not exceeding 1 000 Bq/m ³ Many countries choose lower RL's (eg; 200 or 300 Bq/m ³)	Average annual effective dose limit of 20 mSv (Application of dose constraints)
Actions Required	Reducing radon concentration Optimisation	Optimisation of protection from all sources of exposure Development of radiation protection programme Dose assessment and recording Authorisation of practice

Boundary of Planned/Existing

- Planned Situation

- Radon not usually considered (eg; nuclear or medical)
- Natural radon concentration exceeds the RL and cannot be reduced
- Workers exposed at work
- Doses from radon need to be considered

- Existing Situation

- Workplace unfamiliar with radiation (general business)
- Radon levels are elevated due to due to natural background or the workplace
- Rn levels required to be optimised
- Doses may need to be assessed

Answer in GSR Part 3

- GSR Part 3 Clause 3.4 (d)
 - *Exposure due to natural sources is, in general, considered an existing exposure situation and is subject to the requirements in Section 5. However, the relevant requirements in Section 3 for planned exposure situations apply to:*
 - (d) Exposure due to 222Rn and to 222Rn progeny where the annual average activity concentration of 222Rn in air in workplaces remains above the reference level established in accordance with para. 5.27 after the fulfilment of the requirement in para. 5.28.*
- Many “non radiation” workplace to become subject to planned exposure situation requirements (eg; hotels, hospitals, carparks, schools).

Planned and Existing Exposure Situations

Exposure due to Rn-222, Rn-220 and their progeny in workplaces (industrial activity)

The activity concentration of any radionuclide in the U-238 decay series or the Th-232 decay series exceeds 1 Bq/g in any process material ?

Y

N

The industrial activity is regarded as a practice, and the requirement for planned exposure situation apply.

(Situation: Existing, Requirement: Planned)

The material is not regarded as Naturally Occurring Radioactive Material, and the industrial activity is not regarded as a practice, and the requirement for existing exposure situations apply.

(Situation: Existing, Requirement: Existing)

Comply with the exemption criteria (DS499)

Y

N

Exempted

Not exempted

No further action is required.

Radon in workplaces in such industrial activity

**Requirement for Planned Exposure Situation
See Section 4 (DS519)**

**Requirement for Existing Exposure Situation
See Section 3 (DS519)**

When is This Applicable ? (What is a workplace ?)

- Industries with NORM
- All below and partially-below ground workplaces (including basements)
- Underground mines
- Tunnels, galleries and tourist caves
- Use of groundwater
 - Fish hatcheries, water treatment
- Food, agriculture and storage caves
 - Production of wine or cheese, for cultivation of mushrooms
- Workplaces where the radon levels might be elevated due to the geological conditions or due to limited ventilation

Implications for Australia

- Low impact
- Good to have a consolidated and broader understanding of radon concentrations
- Underground mines and workplaces
- Basements in old buildings (maybe made of granite)
- Storage areas for rock/ore samples
- Enclosed sheds with lots of water turbulence
- Enclosed areas with low ventilation rates

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IAEA DS519 Draft Safety Guide - Protection of Workers Against Exposure due to Radon

ARPANSA coordinates comments on behalf of Australia on IAEA draft documents. The IAEA is seeking comments from their member states on a new draft IAEA Safety Guide – DS519 Protection of Workers Against Exposure due to Radon.

The Issue

Start/End Date: Friday 10 December 2021 - 09:00 to Monday 21 March 2022 - 17:00

What is the purpose of the guide?

The objective of the Safety Guide is to provide recommendations on protection of workers against exposure due to radon in workplaces, in planned and existing exposure situations, including the case of combined exposure to radon and other sources. The recommendations in the Safety Guide are based on the application of the graded approach.

The Safety Guide is aimed at governments, regulatory bodies or other relevant competent authorities, employers, licensees, registrants, workers and service providers.

How to make a comment

Comments are requested in relation to:

- **Relevance and usefulness:** Are the stated objectives appropriate and are they met by the draft text?
- **Scope and completeness:** Is the scope appropriate and is it adequately covered by the draft text?
- **Quality and clarity:** Does the guidance in the draft text represent the current consensus among specialists in the field and is this guidance

Final Comments

- Unlikely to have significant consequences in Australia
- RP practitioners need to think about radon
- Workplaces need to understand radon exposures
- Implication that radon needs to be incorporated in all planned exposure situations
- Boundary between natural background and project impact exposures getting messy
- Complexity requires expertise – a key issue

Thankyou for listening !

JRHC

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