



University of
St Andrews

Risk Assessment No 6 - Risk Assessment for the Notification to work in Radon Atmosphere Under the Ionising Radiations Regulations 2017

Ionising Radiations Regulations 2017

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RISK ASSESSMENT 6 – Notification of work in a radon atmosphere under the IRR 2017 Regulations

Location of Work

Irvine Building - Geological Store

Description of Work and Scope of the Assessment:

Exposure to Radon in the geological store where there are radioactive ores being stored

This risk assessment has been carried out in accordance with the Ionising Radiations Regulations 2017 (IRR17) Approved Code of Practice (ACoP). This risk assessment only addresses the radiological risks associated with the type of equipment detailed above.

Who is at risk?

The Geological sample curator, the DRPS for the School of Earth and Environmental Sciences, the University Radiation Protection Officer (URPO) and the Radiation Protection Adviser (RPA). No other persons are allowed access without permission of URPO

ACoP Paragraph 70 - Matters to be considered in an assessment, where relevant

70(a) - Nature of the radiation sources likely to be present

Radioactive ores enclosed in lead lined boxes which include Pitchblende, Uranium ores, Thorium Ores etc.

70(b) - Estimated dose rates

Maximum dose rate on surface of the boxes is 20 $\mu\text{Sv/h}$. This is reduced to 7.5 $\mu\text{Sv/h}$ at marker tape on floor. Radon dose rate estimated at 4 $\mu\text{Sv/h}$.

70(c) - Likelihood of contamination arising and being spread

The likelihood is very small as the boxes with the ores are not moved or opened without the approval of the URPO

70(d) - Results of previous personal dosimetry and area monitoring

Maximum of 490 Bq/m^3 radon reported in measurements carried out in 2017

70(e) - Advice from manufacturers or suppliers about safe use and maintenance of equipment

Only authorised personnel as above will be allowed into the area where this equipment is located without permission of URPO. All persons entering must wear a whole body dosimeter badge when entering this area

70(f) - Engineering Controls, etc. In place or planned

The door to the store is locked and the Geological sample curator is the only person with a key. Ores are kept in a locked lead lined box to provide suitable shielding from radiation. There is no mechanical ventilation in this store due to other hygroscopic ores vital to teaching and research in the department

70(g) - Planned Systems of Work

For routine work entry into this area there is a system of work

70(h) - Estimated airborne and surface contamination levels

Radon and associated daughters as identified in 70(d).

70(i) - Effectiveness and suitability of PPE

Laboratory coat, gloves and eye protection should be worn.

70(j) - Unrestricted access to high dose rates or significant contamination

Not allowed for routine work. No access to inside the lead lined shielded containers.

70(k) - Possible accident situations, their likelihood and severity

These ores must not be accessed. Any one requiring access will require a new risk assessment to cover the operation which will identify potential accidents.

70(l) - Consequences of failure of Control Measures including Systems of Work
See Table 1
70(m) - Steps taken to prevent accidents, or limit their consequences

TABLE 1

Step	Who is Affected	Hazard		Initial Risk			Controls	Residual Risk		
		Description	Effect	SF	FF	R	List of Controls Required	SF	FF	R
1	Geological curator	Radiation dose due to inhalation of Radon. Small external dose if in area of sample storage	Possibility of raising risk of some form of cancer.	4	3	12	Limited time per year allowed in area.	3	2	6
2	Other workers entering the building	Radiation dose from Radon. Small external dose in area of sample storage.	Possible risks of cancer	4	2	3	Other workers limited to identified persons who would require very intermittent access.	3	2	6
3	Other workers	Radiation dose from Radon. Small external dose in area of sample storage.	Possible risks of cancer	1	1	1	No other workers or students allowed access to this store. Key controlled held by Geological sample curator. Signage on the door will say Only Authorised personnel can enter.	1	1	1

4	Trades Staff	Some trades staff may be required to enter the store for maintenance or for remedial actions	Possibility of raising risk of some form of cancer	4	3	12	No trades staff can enter this store without being inducted and given a full System of Work which will be prepared in line with a risk assessment reflecting the work they will be carrying out.	3	2	6
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Matrix of Risk Level						
Severity Factor (SF)						
Frequency Factor (FF)	Frequency Factor		Slightly Harmful (1)	Harmful (2)	Very Harmful (3)	Extremely Harmful (4)
		Very Unlikely (1)	1	2	3	4
		Unlikely (2)	2	4	6	8
		Possible (3)	3	6	9	12
		Probable (4)	4	8	12	16
Risk (R) = Frequency factor (FF) x Severity of Harm (SF)						
Risk Rating (R)	Classification	Action Required				
1-2	Low	No additional controls				
3-4	Acceptable	Consider additional controls				
6-9	Moderate	Additional controls to be made				
12-16	High	Task must not be completed. Look for alternative method				

ACoP Paragraph 71 – Outcomes of the assessment

71(a) - Actions taken to keep exposures ALARP

There is a restriction on who may enter the building thus eliminating the general risk to workers. Only one key is available to the store which will ensure that there is no unauthorised staff entry

71(b) - What Engineering Controls, Warning Signals and other Safety Systems are necessary

The door to the store will say 'Only Authorised Entry'. Inside of the door will be a radioactive hazard warning sign. Only named individuals who have received appropriate training may enter the building. The boxes containing the samples are fully labelled.

71(c) - Whether PPE is appropriate and if so what type

Laboratory coat, disposable nitrile gloves and eye protection

71(d) - Dose Constraints

An investigation action level of 0.5 mSv/2months has been adopted.

71(e) - Protection of female employees

No special protection required. No expectant mothers may enter the store.

71(f) - Investigation levels

An investigation action level of 0.5 mSv/2 months has been adopted.

71(g) - Maintenance and testing schedules

There will be 2 yearly measurement of radon levels

71(h) - Contingency Plans
As identified in Local Rules.
71(i) - Training needs
If required for future work all staff entering the store must have passed the University Radiation Protection Course. They will also need specific induction training before entering the store which highlights the risks of radon.
71(j) - Designation of Controlled and Supervised Areas
The area in the immediate vicinity of the ore storage boxes has a dose rate of 10 $\mu\text{Sv/hr}$ thus the area around the ores is deemed a 'Controlled Area' and thus requires a 'System of Work' to enter the immediate vicinity. There is no work undertaken in this area or with the ores.
71(k) - Access restrictions and other precautions for designated areas
The store is restricted to authorised personnel only
71(l) - Designation of persons
Not required.
71(m) - Personal dosimetry
Whole body dosimeter badges issued to workers.
71(n) - Leak testing of radioactive sources
N/A
71(o) - Responsibilities of managers
Ensure that Local Rules are followed, and all staff are properly trained.
71(p) – Monitoring / auditing program to ensure compliance with IRR77
RPA to audit operations every two years

Assessor (sign):



Dr Paul Szawlowski, University Radiation
Protection Officer and Deputy Director of
Environmental, Health and Safety Services
(12/07/2021)

Version number	Purpose / changes	Document status	Author of changes, role and school / unit	Date
v1.0	New Document	Approved	Dr Paul Szawlowski	12/07/2021