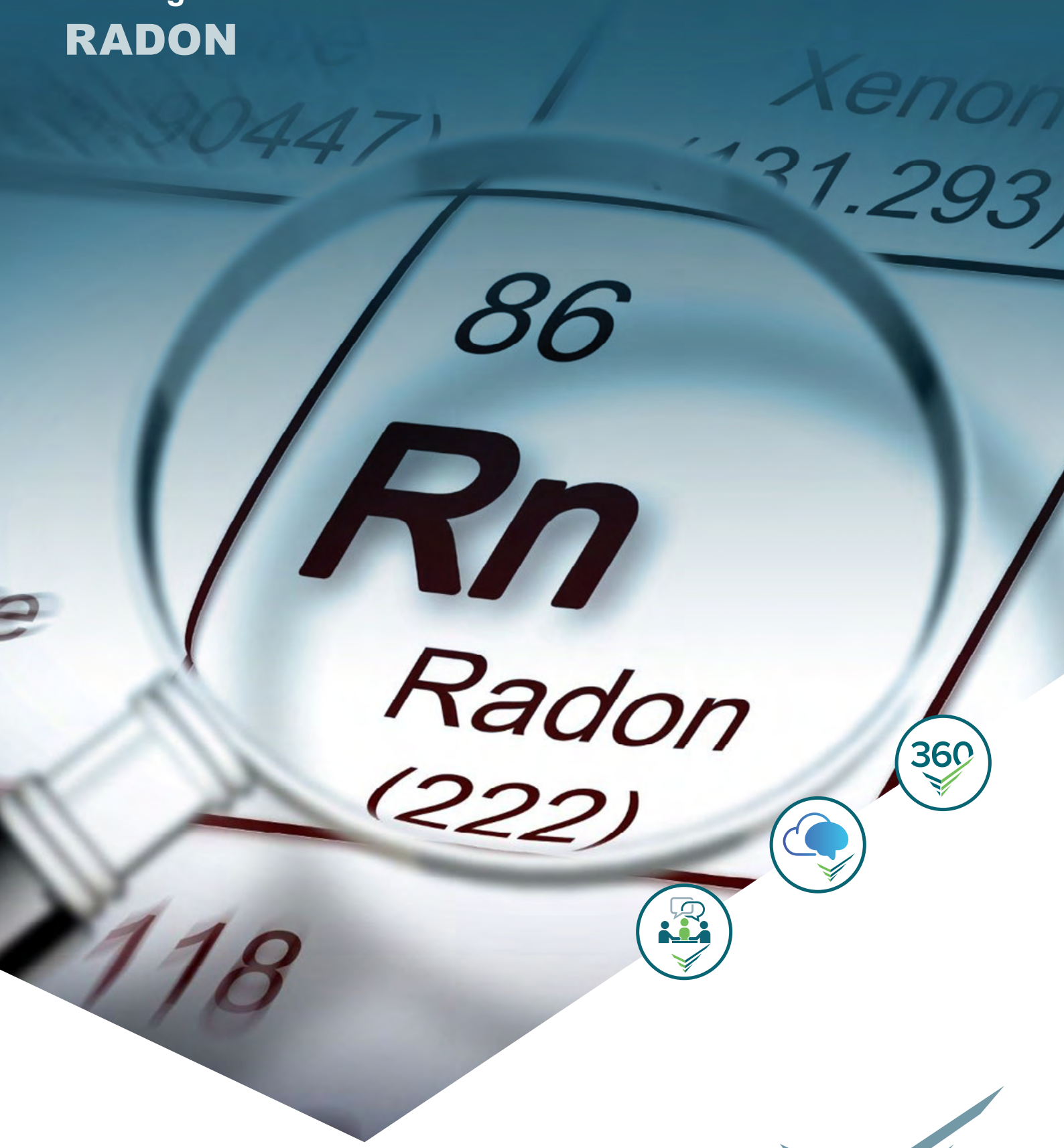
William Martin

Briefing Note

RADON



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Background

This Briefing Note covers the risks associated with the presence of radon gas in the workplace (also known as a naturally occurring radioactive material) and is in response to a number of recent requests from clients for further information and advice.

What is Radon Gas?

- Radon is a colourless, odourless radioactive gas. It is formed by the radioactive decay of small amounts of uranium that occur naturally in all rocks and soils.
- Radon is, under standard conditions, gaseous and easily inhaled, and therefore a health hazard. It is often the single largest contributor to an individual's background radiation dose, but due to local differences in geology, the level of exposure to radon gas differs from place to place. A common source is uranium-containing minerals in the ground, and therefore it accumulates in subterranean areas such as basements. Radon can also occur in some ground water like spring waters and hot springs.
- The main danger from high radon exposure is the increased risk of lung cancer. For most people, radon is the single largest source of radiation exposure whether they are at home or at work.
- It is estimated that radon results in 1000 fatal cancers in the UK every year and in certain areas, a significant proportion of an employee's daily exposure may occur at work (Source: HSE).
- Radon affects the DNA in the lungs and for smokers, the risks are 25 times greater than for non-smokers.
- Every building has radon present and in most areas the levels are low, however, some buildings in "Radon Affected Areas" have higher levels. Buildings in these areas should be tested for radon in order to determine whether control measures need to be introduced to reduce levels by, for example, simple building alterations.
- The unit of radon measurement is the becquerel per metre cubed and the average indoor concentration in the UK is 20 Bq $^{m-3}$

Radiation Protection Adviser (RPA):

The Ionising Radiation Regulations 2017 (IRR) require employers in certain circumstances to consult a Radiation Protection Adviser (RPA) for advice on compliance with the IRR. RPAs are individuals or bodies appointed as competent in writing by the HSE.

Employers who seek to establish whether the IRR applies as a result of radon levels in their workplace do not need to consult an RPA until they have first established whether they apply. Usually this will be done by employers obtaining measurements of the levels of radon in their workplace.

If the exposure level is below 400 Bq m^{-3}, an RPA does not need to be consulted.

Managing Radon

There are three steps to managing radon in buildings:

- Check
  - Check whether a property is in a radon affected area, and if it is, carry out a risk assessment to consider whether any part of the premises could be liable to gas build up, e.g. under-ground rooms, confined spaces etc.
- Measure

  Measurement is very simple and can either be carried out with a meter to give instantaneous results to provide a snapshot, or more commonly by using passive radon detectors supplied by laboratories approved by Public Health England.

- Act
  - If your result is at or above the PHE recommended Action Level of 200 Bq m-3.
  - If the annual concentration exceeds 300 Bq m-3.

Steps to take if concentrations are above the Action Level

- Where annual concentrations are above 300Bq m^{-3}, the HSE should be notified.
- The IRR applies where levels are above 300 Bq m^{-3}
- A RPA with radon experience should normally be consulted about how best to manage radon exposures, but if the employer plans to introduce engineering controls to immediately reduce the radon exposures, they will also need to consult a specialist radon removal (remediation) contractor. The specialist will be able to advise on the most cost-effective engineered means of reducing radon levels. It is usually appropriate to continue monitoring in these areas at least until the reduction measures have been put in place, or to refine where the highest radon levels are located by monitoring additional rooms.
- Risk assessments for workplaces should include employees' exposure to radon for:
  - all below ground workplaces.
  - all workplaces located in radon affected areas.
- Radon concentration measurements undertaken as a result of these risk assessments should provide a result capable of providing an annual average in units of Bq m^{-3}.

- Notifications over multiple sites: when notifying the relevant work to the HSE, the employer only needs to notify this work once for all sites that are under their control where they carry out work with ionising radiation.
- No fee will be charged for a notification.
- Employ risk reduction measures such as:
  - Forced ventilation.
  - Reductions of working time spent in the affected areas.
  - Restrict entry to the affected areas.
  - Ensure employees and contractors are included in any risk reduction measures where individuals my receive an annual dose higher than 6 mSv must be considered ‘controlled areas’.

The Level Of Potential Radon Can Be Found On The Public Health England Website

UKradon - UK maps of radon

It may collect in buildings, and under certain conditions can reach concentrations above which the risk to people in the workplace requires control under the IRR.

As mentioned above, radon (more properly known as radon-222) comes from uranium which occurs naturally in many different types of rocks and soils. Since granite contains relatively high levels of uranium, many people think that it is only granite areas of the UK, such as the South West of England, that have high radon levels. This is untrue and many other parts of the country have high radon levels.

Reviewing Radon Risk Assessments

As with all health and safety hazards, there is the need to conduct risk assessments, and assessing the risks presented by radon exposure, is no exception.

The HSE suggests the following guidelines for reviewing risk assessments (under the Management of Health and Safety at Work Regulations 1999).

- Where radon levels are found to be significantly less than 300 Bq m^{-3} at the initial measurement, the period of remeasurement might be of the order of once every 10 years
- Where radon levels are just below 300 Bq m^{-3} at the initial measurement, the suggested period for remeasurement will be less than 10 years.
- Where radon levels are above 300 Bq m^{-3} at the initial measurement and measures have been taken to reduce radon exposures (such as engineered systems or occupancy restrictions), the remeasurement periods may need to be significantly more frequent in order to verify their continuing effectiveness.
- Where there is significant change in building structure.

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