



Welcome to the 70th issue of the *Environmental Radon Newsletter*. The newsletter was established in 1994 aiming to inform those working in the radon industry about news, developments and projects within the sector.

We hope you continue to find the newsletter interesting and informative. As always, we are happy to hear any thoughts and views you may have about the newsletter. If you have any comments please contact the editor Daryl Dixon, daryl.dixon@phe.gov.uk.

A new name for the Health Protection Agency

As of 1 April 2013, the Health Protection Agency (HPA) became part of a new executive agency of the Department of Health, called Public Health England (PHE).

We will continue our full range of radon work including working closely with local authority partners and government departments across the whole of the UK.

Successful Cornwall programme draws to a close

Hundreds of people across three parts of Cornwall came along to the radon solution days run by the HPA, as the agency wrapped up its current programme in the county.

Over the past year 47,000 households in the former Caradon, Restormel and Carrick districts were offered free radon tests, with those recording high results invited to solution days.

Some of the radon staff travelled to Cornwall and worked with colleagues from Cornwall Council, BRE (Building Research Establishment) and local contractors to give remediation advice to more than 1,300 people who came along.

Save the date!

The date is already set for the 12th UK Radon Forum. The event will be held on 1 November 2013 at Public Health England's Oxfordshire base in

Chilton and, as in previous years, is expected to be fully subscribed.

If you are an industry professional and interested in attending the forum, please contact us and we will ensure you receive an invitation nearer the time, on 01235 822622 or radon@phe.gov.uk.

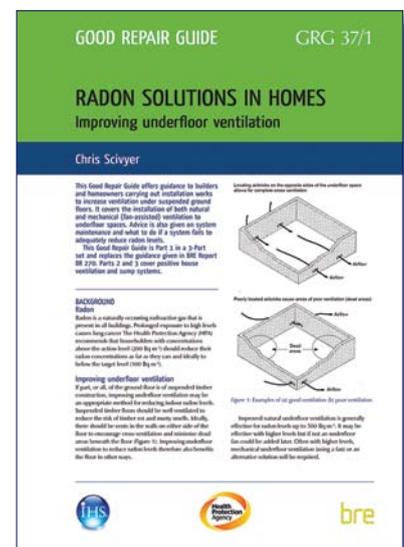
The 2012 event was staged last November and the 90 or so delegates got the opportunity to hear updates on projects in the Forest of Dean, Jersey and Guernsey and from HPA staff who discussed links between smoking and radon.

BRE online builder training now available

New radon remediation training is available online from BRE. With expert knowledge in the field, BRE hopes that contractors and industry professionals will complete this course to increase their awareness of radon and radon remediation techniques. The online course costs £50 (excluding VAT) per person and includes an optional assessment; successful candidates will receive a certificate of training.

Good Repair Guide available online

BRE, in conjunction with PHE, has produced the first in a series of three good repair guides (GRG). The first, GRG 37/1, relates to under-floor ventilation and the next two will cover positive ventilation systems, GRG 37/2, and sump systems, GRG 37/3.



The series is designed to provide guidance to builders and homeowners carrying out radon remediation in their properties. Download your free copy here: www.ukradon.org/downloads/BRE/GRG37_1.pdf.

RADON MYTH

In each issue we will publish a commonly heard myth about radon and the truth behind it ...

Myth: Opening your windows is an effective form of radon remediation

Fact: Opening windows is not a recommended method of radon remediation. Opening windows, especially on the first floor, will generally not produce a significant or sustained reduction in the radon level in the property and may make matters worse. Read more on page 4.

Radon Testing

It is generally recognised that because indoor radon levels vary from day to day, measurements to determine the annual average radon concentration in a building should be carried out over a long period. Measurements to determine whether a house is above or below the radon Action Level are normally carried out over a three-month period. The Action Level is given as an annual average concentration and is 200 Bq m^{-3} .

The health risk from radon depends upon the total exposure over time so it is the long-term average radon concentration in a home that is important. Radon can vary in concentration, sometimes quite dramatically, over hours or days. The highest levels are generally found in the small hours of the morning and in the middle of winter – in other words, the coldest times, when buildings are tightly closed. Because of these variations, measurements are usually made of the long-term average radon concentration; it is difficult to estimate an accurate annual average based on a short-term measurement.

Most companies providing radon measurement services use detectors which are placed in houses for three months, but some companies offer other types of detector which are placed for a week or less.

The chart shows an example of how the radon concentration in a typical building can vary significantly during a short time.

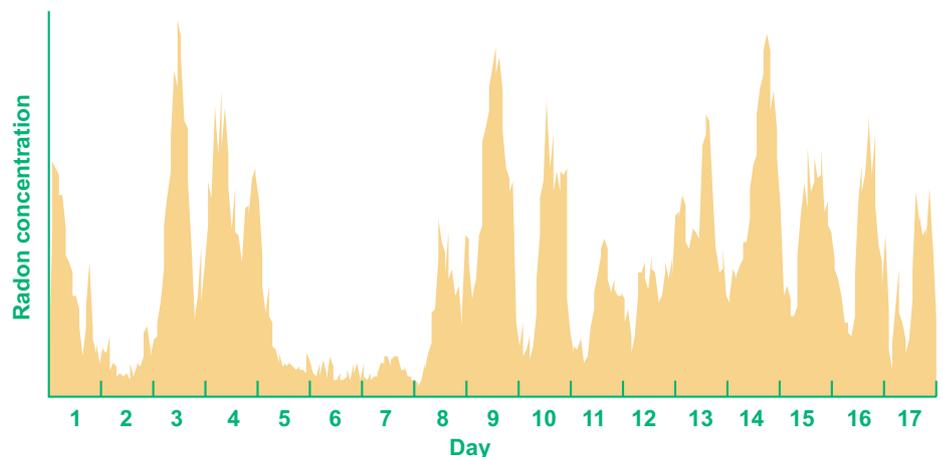
Ideally radon measurements would take place over a full year, to cover

these variations. However, detectors can easily get lost if left in a house for so long and householders do not want to wait that long for results. For these reasons, radon measurements are usually made over a period of three months and the annual average is estimated on the basis of typical seasonal variations in levels.

Although shorter measurement periods may (particularly in lower risk areas) show what seems to be a reassuringly low radon level, the result is not always good enough to support important

decisions about protection levels or costly work, as repeated short term tests can show large variability. For this reason, Public Health England does not encourage screening tests.

Short-term testing is sometimes used by remedial installers to make a quick check of whether a system is effective, but this would be conducted according to their own interpretation of protocols and experience. Even then, a three-month test should always be conducted for confirmation that the target reduction has been achieved.



Daily variation of radon concentration in a typical property

Useful points of contact

PHE Radon Group contact details are given on page 4

UKradon provides general information on radon and details of PHE radon services, including radon risk reports for individual properties in the UK

For a risk report where there is no valid postcode, the building footprint is larger than 25 m in any direction or for plots of land, visit <http://shop.bgs.ac.uk/GeoReports/>

BRE (Building Research Establishment)

E: radon@bre.co.uk
www.bre.co.uk/radon

Health and Safety Executive
www.hse.gov.uk/radiation/ionising/radon.htm

Northern Ireland Environment Agency
E: ipri@doeni.gov.uk
www.doeni.gov.uk/niea/pollution-home/radiation/radon.htm

Welsh Government, Directorate of Sustainable Futures
wales.gov.uk/topics/housingandcommunity/housing/publications/radon

Scottish Government, Health Protection Team
Public Health Division, Area 3EN
St Andrew's House, Regent Road, Edinburgh EH1 3DG
T: 0131 244 2164

The Radon Council Ltd
E: admin@radoncouncil.org
www.radoncouncil.org

A list of laboratories validated by PHE for radon measurements in homes remains available at www.hpa.org.uk

Progress with Radon Mapping

The newsletter has included various articles over the years on technical and operational aspects of radon mapping. The first map of England was published by the (then) National Radiological Protection Board in 1996 and there have been various updates and developments since. This article provides an overview of the current state of Public Health England (PHE) maps and their use.

The main purpose of radon maps is to enable users anywhere in the UK to find out:

- The likelihood of having a high level in their home
- The need for testing a household
- Preventive measures that are required with building work

The maps have been split by region, so there are separate maps each for England with Wales, for Scotland and for Northern Ireland. The current atlases are HPA-RPD-033, HPA-CRCE-023 and HPA-RPD-061, respectively, and are available at www.ukradon.org. While the basic format of maps is the same across all regions, the mapping procedure has evolved.

PHE radon maps are based on combined radon test results held by PHE for area units based on the Ordnance Survey grid, originally 5 km scale. This approach, however, takes no account of underlying geology, which is the root cause of radon in buildings.

A more sophisticated approach, developed jointly by PHE and the British Geological Survey (BGS), brings geological information into the analysis. This uses 25 m squares, so

it provides a much finer guide to the boundaries of high radon areas, This means, however, that there is too much detail to be able to show it clearly on a paper map of manageable size. This is known as the Joint Dataset (JDS) and provides a **definitive** map.

The radon JDS will be updated jointly by PHE and BGS when there is sufficient new data or a change to protection policy that materially affects use or interpretation of the maps. The large number of results used ensures that the JDS is reliable and stable. Geology is also stable, so we expect the JDS for a region to be in use for quite a few years before it is updated.

Access to radon mapping data

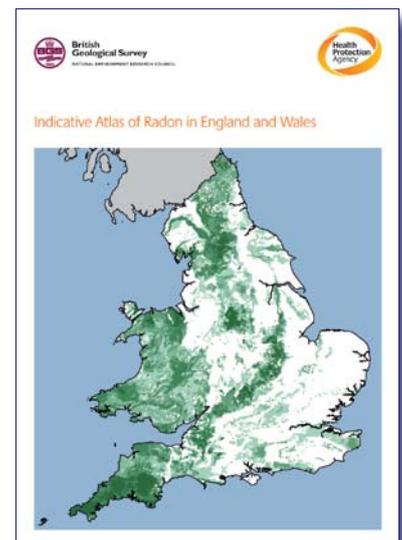
As a large dataset, the JDS is particularly suited to access through electronic systems and PHE has set up a website, www.ukradon.org, to access JDS for a specific property address. This avoids any concerns about use and interpretation of map coordinates, data or obsolete reports.

As well as providing a guide to health risk, the website report also shows whether radon preventive measures are required in new structures, taking

account of the differing protection requirements for radon across UK.

User licences based on geographical area of interest and duration are available from BGS for organisations that require frequent, continuing use of radon probability data.

Because many people still find a paper map useful, PHE has published a series of radon atlases with A4 plates that provide local detail (see example below). As these cannot show the full detail of the JDS, the results are shown by 1 km grid squares and give the worst case for each square.



Indicative Atlas of Radon in England and Wales

The chance of having high radon levels in a property is categorised into coloured bands of probability. The maps show each 1 km grid square coded according to the highest probability anywhere in the square, even if in a very small part of that square. These are called **indicative** maps.

It is important, therefore, to use the correct resource for the task.

The website www.ukradon.org is best for most applications; for other applications contact PHE by email at radon@phe.gov.uk.

Application	Website	Radon atlas
Get radon potential report for specified address	Best option	Only valid for grid squares where fewer than 1%* of houses are affected
Get radon potential report for premises exceeding 25 m in any extent	Neither suitable, contact PHE for advice	
Regional overview of extent of high radon areas	Use either – shows worst case radon potential by 1 km grid, definitive only in lowest radon potential areas	
Determine whether an existing building is at a location where radon preventive measures are needed for extensions or refurbishment	Best option	Only valid for grid squares where fewer than 1%* of houses are affected
Regional overview of need for radon preventive measures during construction	Use either – shows worst case radon potential by 1 km grid, definitive only in lowest radon potential areas	

* 3% in Northern Ireland

Will Opening Windows Reduce the Radon Level in My Home?

When most people hear they have a dangerous gas in their homes their first reaction may be to open the window and allow fresh air in for ventilation.

The bad news is that such a step is unlikely to affect your long-term radon level.

The problem is that houses can respond surprisingly to changes in ventilation. Essentially a house acts as a chimney. Air moves up through the house due to warm air rising through the house (the stack effect) and due to suction effects caused by wind action. The air eventually finds its way out through gaps at the top of the house. This air is then replaced by more air entering lower down in the house. If it enters through doors and windows or vents in walls above ground, then it will be outdoor fresh air and should not pose a

problem. But if the doors, windows and walls are relatively airtight then air will be drawn in from the ground through gaps in and around the floors, and this air can contain high levels of radon. Air may also be drawn in from gaps in the cavity wall and, again, this air may contain high levels of radon.

So, what happens if we open more windows to try and solve the problem? It depends – if we open the wrong windows we can actually make the problem worse. For example, it is quite common to shut downstairs doors and windows for security and then open bedroom windows upstairs for ventilation. This has the effect of increasing the stack effect which increases indoor radon as more air is drawn in from the ground.

Instead, the aim should be to allow fresh air in downstairs through window ventilators, which are a secure way of reducing stack effect and also helps to dilute the radon.

Even so, it is important to recognise that in most cases the reduction in radon level that can be achieved will be small. It is one of the least effective ways of reducing radon levels in a house, and should therefore only be used in combination with other methods.

To be successful, changes to ventilation must be permanent. Good ventilation practice is of course about more than just opening windows. The following measures will also improve the general indoor environment and can help to reduce radon levels.

- Cap-off and seal unused chimneys, whilst maintaining some ventilation to prevent condensation in the cavity
- Ensure a heating appliance discharging into a chimney has adequate fresh air supplied to the room from outside. If ventilation has been provided by cutting a hole through a timber floor, the hole should be sealed and an alternative source of ventilation provided
- Seal large gaps in and around floors
- Draught-proof loft hatches and seal around pipes or ducts which pass through the ceiling into the roof
- Seal cracks around upstairs windows
- Avoid prolonged use of extractor fans in kitchens, bathrooms and WCs. Fans should only be used intermittently to clear odours or reduce condensation
- Provide some ventilation downstairs, by installing trickle vents in downstairs windows or fitting through-the-wall vents



Opening windows is unlikely to reduce the long-term radon level

Editor:

Daryl Dixon
daryl.dixon@phe.gov.uk

This newsletter is produced for the Chartered Institute of Environmental Health and the Royal Environmental Health Institute of Scotland by the Centre for Radiation, Chemical and Environmental Hazards of Public Health England. It is published quarterly as an insert in the CIEH journal *Environmental Health News* and the REHIS journal *Environmental Health Scotland*. In addition, it is distributed to subscribers by PHE and is freely available at www.ukradon.org. The views expressed in the contributions are not necessarily those of the CIEH, REHIS or PHE.