

Environmental **Radon** Newsletter

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Radon programme for schools in England - phase I

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The health of children in schools is always a hot topic, whether it is exposure to radon or wi-fi, or being disproportionately affected by swine flu. Back in the spring of 2008, a radon awareness programme for schools had been proposed (see Environmental Radon Newsletter Issue 54). One year later, the first phase of the programme has been launched, covering the North-West and West Midlands regions of England, with positive initial responses.



Many councils with long-standing radon Affected Areas already have mature schemes of measurement and mitigation. With the update of the radon dataset and atlas in November 2007 (see Environmental Radon Newsletter Issue 51), several additional areas were identified that had previously been considered at low risk. Employers have a duty under The Management of Health and Safety at Work Regulations 1999 to

'make a suitable and sufficient risk assessment of...the risks to the health and safety of his employees to which they are exposed whilst they are at work.'

Any schools in radon Affected Areas have an identified hazard, so measurements are most likely required to assess the risk.

By making the employers, in this case mostly Local Educational Authorities (LEAs) aware of the hazard, the rest of the risk assessment should follow in due course.

The first part of the programme, therefore, was to obtain a current list of all schools in England. The schools buildings portfolio is a moving target of refurbishments, replacements and management changes. After some effort, however, the postcode of every school was matched against the Affected Areas dataset and a radon potential assigned. In order to manage the size of the programme, it had been decided to limit the scope to the current compulsory education age range of 5 - 16.

At the beginning of June, we (the Health Protection Agency radon team based at the Centre for Radiation, Chemical and Environmental Hazards, Chilton) wrote to the Directors of Children's Services of 32 councils in

the North-West and West Midlands HPA regions. Along with a letter explaining the intention of the programme, we included a leaflet tailored to each LEA listing each radon Affected school, a guide on placing monitors, a sheet of radon FAQs and a model letter that could be sent to parents at the discretion of the school concerned.

After a slow start, we have since received a steady stream of enquiries as the information has percolated through to the appropriate teams. Interestingly, this has covered quite a range of responsibilities, including Health and Safety, Asset Management, Children and Young People's Services, and Contaminated Land Management. Most contacts have been supportive and enthusiastic. A few, however, have expressed individual or management disbelief that there are radon Affected Areas in their LEA, which will always be a problem when datasets are updated and refined over time. In addition, there is the continuing problem of radon being one of many demands on time and resources.

At the time of writing, just prior to the start of the autumn term, a quarter of LEAs have committed to radon monitoring programmes (representing more than 200 schools), and we have had positive contact from over two-thirds. A standing offer was made by us to visit any LEAs concerned over the programme or its likely impact which has been taken up so far by a group of councils in the North-West.

Of course, there will be further enquiries to deal with as the monitors are being placed and the inevitable concerns when high results are found. This is also the first phase of the programme, which is intended to run for several years. In later phases, lessons learnt in this phase will be applied to improve the effectiveness of the programme.

This newsletter and previous editions can be seen at www.hpa.org.uk/radonnewsletter

POINTS OF CONTACT

www.UKradon.org provides general information on radon, and also an estimate of the probability that an individual property in England and Wales is above the Action Level for radon.

Building Research Establishment (BRE)
Garston, Watford, WD2 7JR
www.bre.co.uk/radon

Radon Survey
Radiation Protection Division,
Health Protection Agency
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Welsh Assembly Government
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Northern Ireland Environment Agency
Klondyke Building, Cromac Avenue
Gasworks Business Park
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Belfast BT7 2JA
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Scottish Executive Development Department
Housing Division I
First Floor East, Victoria Quay
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www.hse.gov.uk/radiation/ionising/radon.htm

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Laboratories validated by the HPA for making measurements of radon concentrations in homes are listed at: www.hpa.org.uk/radonvalidation

To obtain a report on the requirement for radon protective measures for building sites, go to <http://shop.bgs.ac.uk/Georeports>

HPA Consultation on the Limitation of Human Exposure to Radon

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The Health Protection Agency (HPA) is considering revising its advice on radon exposure. Proposed new advice was published as a Consultation Document in June 2009* and is outlined here.

The National Radiological Protection Board (merged with the HPA April 2005) issued advice on protection against radon in 1990. The HPA decided to consider revising the NRPB advice because since 1990:

- new epidemiological data has been published showing a link between exposure to radon in the home and an increased risk of lung cancer.
- there is an increasing body of experience on remediation of radon in homes.
- health economics modelling suggests that government-funded surveys of high radon areas would be more cost-effective if the radon Action Level was reduced.
- analysis carried out by the independent Advisory Group on Ionising Radiation to the HPA indicated that the majority of radon-related lung cancer deaths in the UK occur amongst the large percentage of the population exposed to modest radon levels.

In addition, various international organisations, including the World Health Organization, the International Commission on Radiological Protection, the European Union and the International Atomic Energy Agency, have recently issued or are developing revised advice on protection against radon. Increasing concern about the health risks from radon at UK Government level and the devolved administrations as well as interest from expert groups such as the Committee on the Medical Aspects of Radiation in the Environment also made the reconsideration of the HPA's advice timely.

The HPA asked seven questions, the first one being the most important:

The HPA recommends the value of the Action Level and the concept of Affected Areas should be reconsidered. Three possible options are listed below. Do you agree with any of these options, and why, or do you propose a different option and why?

Option 1: No change to the value of the Action Level (200 Bq m⁻³), to the threshold for Affected Areas (1%), or to the threshold for full preventive measures in new buildings (10%).

Option 2: Reduce the value of the Action Level to 100 Bq m⁻³ and define Affected Areas as those where 5% of homes are above the new Action Level.

Option 3: Reduce the value of the Action Level to 100 Bq m⁻³ and replace the Affected Areas concept with three bands of radon risk: low, medium and high. The division between the low and medium risk bands is where 5% of homes are estimated to be above the new Action Level. The division between medium and high risk bands would be at a higher threshold. It is suggested that a threshold of 30% is used. This threshold for the high risk band would include about 50% more households than the current threshold for full protective measures in new dwellings in the UK (10% of homes above 200 Bq m⁻³).

Other questions considered the use of the domestic radon Action Level in non-domestic buildings that have prolonged public occupancy, research on effective methods for radon prevention in new buildings and on passive preventative and remedial measures. HPA also asked for opinions about possible strategies to encourage more remediation by property owners and ways to improve public communications on the complex subject of radon.

There were 13 responses to this Consultation Document, from government and non-governmental organisations and individuals. HPA is currently considering these responses, and will publish a document on radon policy in the new year.

*HPA Advice on the Limitation of Human Exposures to Radon. HPA Radiation Consultation Document. Available for free download on www.hpa.org.uk (search term 'radiation consultations').

Radon in Cornwall

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Healthy Communities Manager, Lee Wagland, gives examples of how radon services have been extended and made more uniform across the new unitary authority of Cornwall Council.

On the 1st April 2009, Cornwall Council became a unitary authority with the amalgamation of the County Council with the six previous local authority (LA) district areas of Penwith, Kerrier, Carrick, Restormel, Caradon and North Cornwall, see figure. Cornwall is now divided into three delivery areas; West (Penwith and Kerrier), Central (Carrick and Restormel) and East (North Cornwall and Caradon).

The county is known to be a highly affected radon area, with much of it within the greater than 30% risk band. Prior to the formation of Cornwall Council, radon was addressed in different ways by the County Council and the six district LAs. The County Council had primarily focused on its duty as an employer, focusing on places of work such as offices and schools together with nursing and residential homes. The districts had the opportunity to participate in funded rollout programmes by DEFRA and subsequently Department of Health. Three of the six district authorities implemented such programmes namely; Kerrier, Penwith and North Cornwall.

Since reorganisation, Cornwall is in a unique position in having one unitary authority, Cornwall Council, covering the whole county enabling a comprehensive and strategic approach to tackling this issue across the county.

On amalgamation, the Public Health and Protection (PH&P) service was formed, which encompasses the six district environmental health departments, trading standards departments, licensing teams, port health authorities and the registration service. This has brought together a wealth of radon knowledge which will be used in future to help, guide and facilitate further work.

One of the first things the PH&P service initiated in partnership with the Health Protection Agency was to secure agreement to extend the rollout programmes thereby ensuring countywide coverage. In view of this, new radon rollout programmes are to be offered throughout the Central and part of the East delivery areas. This is an early example of how the new authority has extended and created a more uniform service to the residents of Cornwall.

Information and knowledge, built up over several rollout programmes, is being used to support enforcement programmes. For example, privately rented properties exceeding the 200 Bq m⁻³ Action Level are made known



to the Healthy Homes teams to action. Such data will be used to prioritise inspections and inform enforcement action. Information will also be offered to our colleagues in the Building Control Service to highlight new-build failures and to help establish whether there was a consistent failure by particular developers, leading to more scrutiny of their procedures when fitting precautions.

Strong links have been forged recently with the local stop-smoking service, which provides information on where help and support are available to those wishing to quit. Plans are underway to bring advice about smoking risks to radon solution events.

Cornwall Council will now grasp the opportunities afforded to it by its unitary status and develop partnerships to tackle this important health issue.

News

The World Health Organization (WHO) has published its handbook on indoor radon*. This is the culmination of the WHO International Radon Project that began in 2005 and in which more than 100 scientists from 30 countries participated. The handbook focuses on residential radon exposure from a public health point of view and provides detailed recommendations on reducing health risks from radon as well as policy options for preventing and mitigating radon exposure. WHO recommends setting a national reference level, the maximum accepted radon concentration in a residential dwelling, as low as reasonably achievable. It advises on appropriate reference levels as follows;

“In view of the latest scientific data, WHO proposes a reference level of 100 Bq m⁻³ to minimize health hazards due to indoor radon exposure. However, if this level cannot be reached under the prevailing country-specific conditions, the chosen reference level should not exceed 300 Bq m⁻³ which represents approximately 10 mSv per year according to recent calculations by the International Commission on Radiation Protection.”

*WHO Handbook on indoor radon – a public health perspective, World Health Organization, 2009. Available for free download on www.who.int/en/ (search term ‘radon handbook 2009’).

When screening tests can and can't be used

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Short-term screening tests can be used to measure radon concentration but if the results are in an equivocal range, 3-month confirmatory measurements will be necessary. HPA evidence and guidance for use of screening tests is reported.

The Health Protection Agency (HPA) generally discourages householders from using short-term screening measurements to determine annual mean radon concentrations in homes, because they are less accurate than long-term measurements. However, when time is short, such as during house purchase, some householders are anxious to obtain a quick result. The results from short-term measurements will be equivocal if they are close to the radon Action Level (see also Environmental Radon Newsletter Issues 29 and 46). In cases where the results are equivocal, longer-term confirmatory measurements are required (see table).

The HPA has recently published a paper* comparing the results of short-term screening measurements with those from three-month measurements in 59 homes across the UK. For each home, four HPA etched-track detectors (with especially low alpha background) were used. Two of the detectors were returned between 14 and 30 days after placement, the remaining two detectors were returned after at least 60 days in the home. Estimated annual mean radon concentrations ranged up to 2000 Bq m⁻³.

For the standard (three-month) detectors, seasonal correction factors were applied to estimate the annual mean concentration of the home, following standard HPA practice**. For the short-term screening measurements, temperature correction factors* were applied to estimate the mean annual concentration of the home, as monthly seasonal correction factors were thought to be inappropriate for such short exposure times.

Where the result from short-term detectors was between 100 and 400 Bq m⁻³, householders were advised that the result of the standard

(three-month) measurements was required before the result could be reported. Because both the short-term and long-term detectors had been placed together in the home at the same time, the householder did not need to take further action. Where the estimated annual mean concentration from the short-term test was below 100 Bq m⁻³, householders were advised their home was below the UK Action Level. Where the concentration was above 400 Bq m⁻³, they were advised their home was above the UK Action Level and they need not wait for the standard measurement result before commencing remediation.

The paper compared the estimated annual mean radon concentration calculated from the short-term measurements to the value calculated from the long-term results for each home. The analysis confirmed that all householders with results outside the equivocal range had been advised correctly on whether their home was above or below the Action Level using the stated threshold range (see table). All homes with a short-term derived annual mean concentration less than 170 Bq m⁻³ had a long-term derived annual mean radon concentration below the radon Action Level of 200 Bq m⁻³, and all those with a short-term radon result greater than 300 Bq m⁻³ had a final estimated mean radon concentration above the Action Level.

The threshold concentrations used are therefore more conservative than was found to be necessary for these homes.



An extreme example of indoor radon levels varying from day to day

However given the relatively small sample of homes, the HPA will continue to use the current thresholds when advising householders following an HPA screening test. Based on this evidence, the HPA has updated its guidance on when a three-month measurement should be used to determine annual mean radon concentration. This guidance is based on the measurement period, not the type of detector. **The shorter the measurement period, the larger the equivocal range of concentrations in which a three-month measurement is required.** Confirmatory longer measurements are more likely to be required in radon Affected Areas (where the median average radon concentration is likely to be in the equivocal ranges), than in lower radon risk areas.

* An etched track detector for short-term screening measurements of radon. Z-F Ibrahimi and JCH Miles, Journal of Radiological Protection, 29, 139 - 146 (2009).

** HPA-RPD-047 - Validation scheme for organisations making measurements of radon in dwellings: 2008 Revision. CB Howarth and JCH Miles. Available as a free download on www.hpa.org.uk/radonvalidation.

When a repeat three-month measurement is needed

Measurement period, days	Typical Detector	Equivocal range of measured radon concentration, Bq m ⁻³
4 to 7	Charcoal or Electret	75 to 500
14 to 30	Etched-track	100 to 400

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