



Assessing the risk

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Radon is a naturally occurring radioactive gas produced by the radioactive decay of radium which, in turn, is derived from the radioactive decay of uranium. Uranium is found in small quantities in all soils and rocks, although the amount varies from place to place.

Relatively high levels of radon emissions are associated with particular types of bedrock and unconsolidated deposits. These include some but not all, granites, phosphatic concentrations, and shales rich in organic materials. The release of radon from rocks and soils is largely controlled by the types of minerals in which uranium and radium occur. Once radon gas is released from minerals, its migration to the surface is controlled by the permeability of the bedrock and soil; the nature of the carrier fluids; and meteorological factors such as barometric pressure and rainfall.

Radon released from rocks and soils is quickly diluted in the atmosphere. Concentrations in the open air are normally very low and probably do not present a hazard. Radon that enters poorly ventilated buildings, caves, mines, and tunnels can reach high concentrations in

some circumstances. Radon levels in buildings can be influenced by the construction method and the degree of ventilation. A person's exposure to radon will also vary according to how particular buildings and spaces are used.

Inhalation of the radioactive decay products of radon gas increases the chance of developing lung cancer. In order to limit the risk to individuals, the Government has adopted an Action Level for radon in dwellings of 200 becquerels per cubic metre ($Bq\ m^{-3}$). If radon is a problem, it can usually be tackled with simple, effective and relatively inexpensive measures which are comparable in cost to work such as damp-proofing and timber treatment.

Geological radon potential

The variation in radon levels between different parts of the country is mainly controlled by the underlying geology. Geological radon potential indicates the probability that houses built on a geological unit will have radon concentrations exceeding the Action Level. It is based on a range of data including radon measurements in soil and dwellings; soil and rock permeability; uranium concentrations; and gamma spectrometric data. Geological radon potential does not indicate whether a dwelling constructed on a particular site will have a radon concentration that exceeds the Action Level. This can only be established by having the building tested. Advice on radon testing is available from the National Radiological Protection Board (NRPB) at Chilton, Didcot, Oxfordshire OX11 0RQ.

Radon

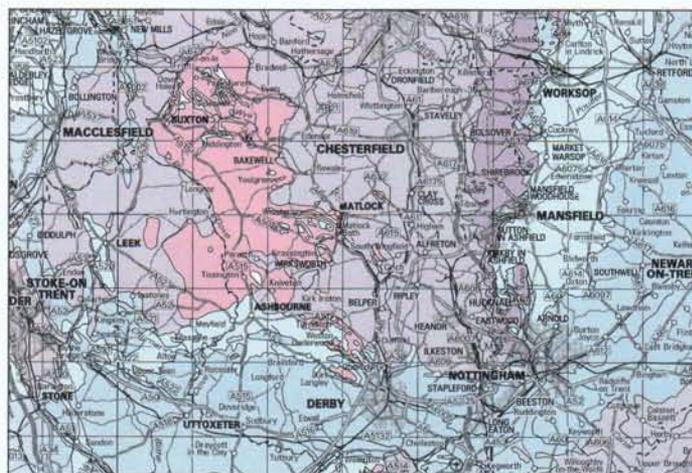
The BGS has published 1:625 000 scale maps (North and South sheets) of Radon Potential Based on Solid Geology and has started to produce a 1:250 000 scale radon potential map series as part of the BGS Natural Environmental Radioactivity Survey (NERS).

Radon in new development

The BGS is managing a Department of the Environment (DOE) research programme 'Dealing with Radon Emissions in Respect of New Development' which aims to identify the circumstances where new development may be adversely affected by radon emissions and the appropriate response to such problems. The project is being carried out in collaboration with the Building Research Establishment, the National Radiological Protection Board and Land Use Consultants.

Geological radon potential can be used:

- to assess whether radon protective measures may be required in new buildings;
- for the cost-effective targeting of radon monitoring in existing dwellings and workplaces;
- to provide a radon assessment for homebuyers and sellers through the Address-Linked Geological Inventory (ALGI).



Extract from BGS 1:625 000 scale map of Radon Potential Based on Solid Geology showing Derbyshire and part of Nottinghamshire, Cheshire and Staffordshire. Pink and dark purple denote areas of ground susceptible to high levels of radon emissions. (Crown Copyright. Licence Number GD272191/1997).