

CROSS-GOVERNMENT ACTION FOR ADDRESSING THE HEALTH RISKS FROM RADON GAS IN SCHOOLS IN WALES

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WAG, Cardiff

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Overview

BACKGROUND

Radon risks in the workplace

Legal requirements for workplaces

Practical risk assessment

SCHOOLS PROJECT

Aims & Objectives

Scope

Project outline

Implications for schools

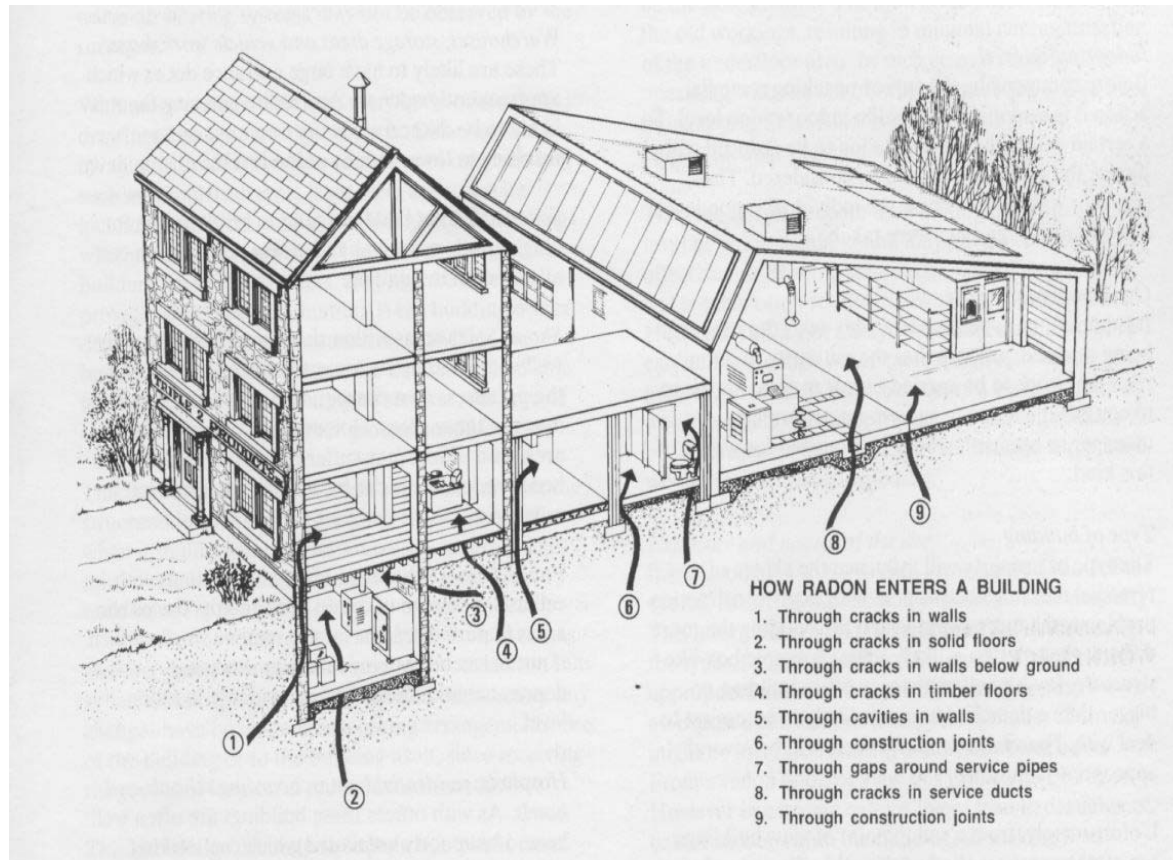
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Radon risks

Natural radioactive gas that emanates from the ground.

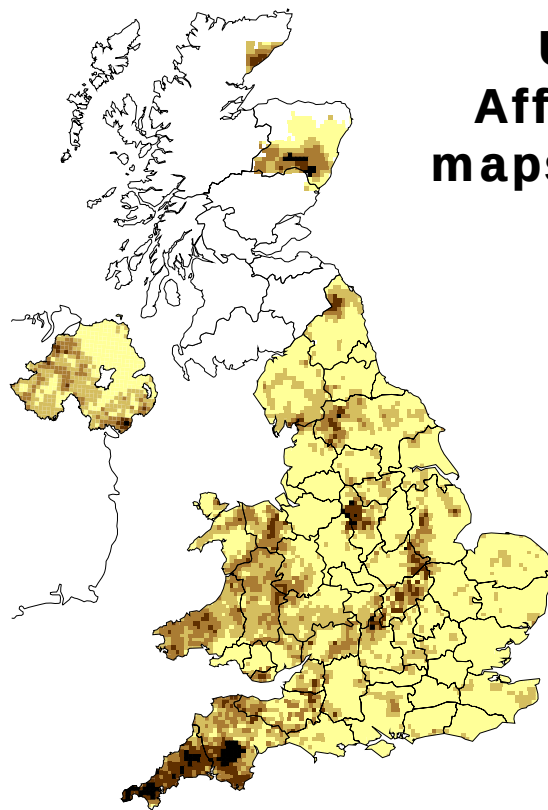


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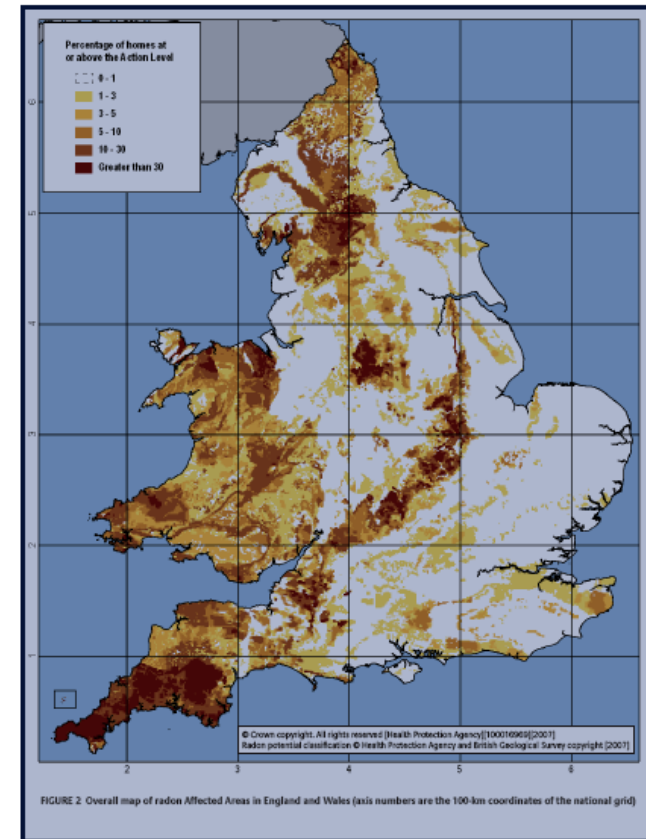


Radon risks



2002 – November 2007

**UK Radon
Affected areas
maps** (produced by
HPA)



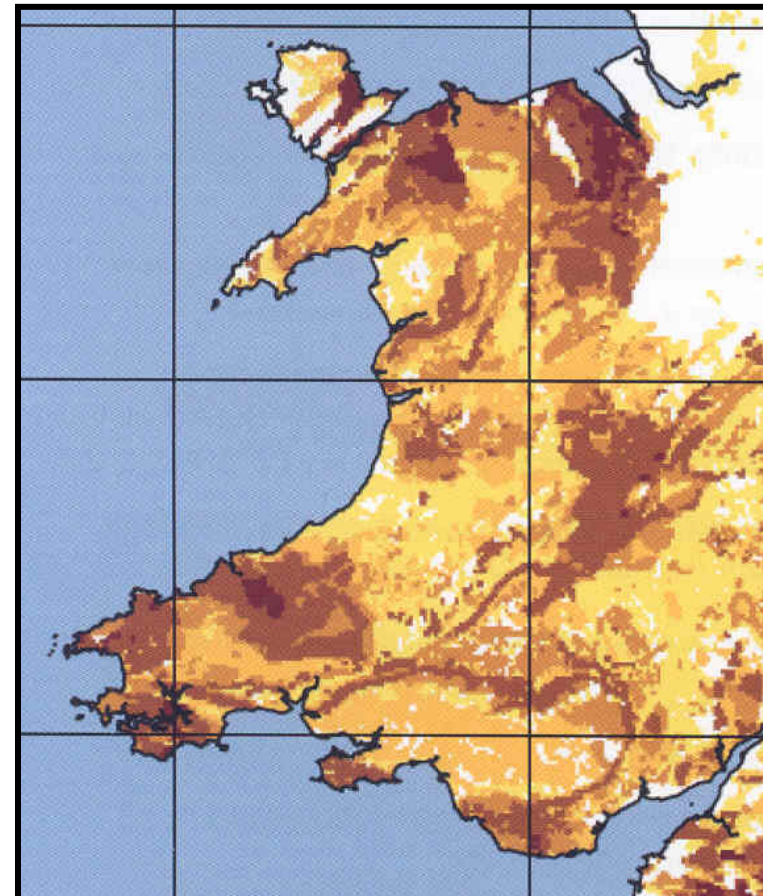
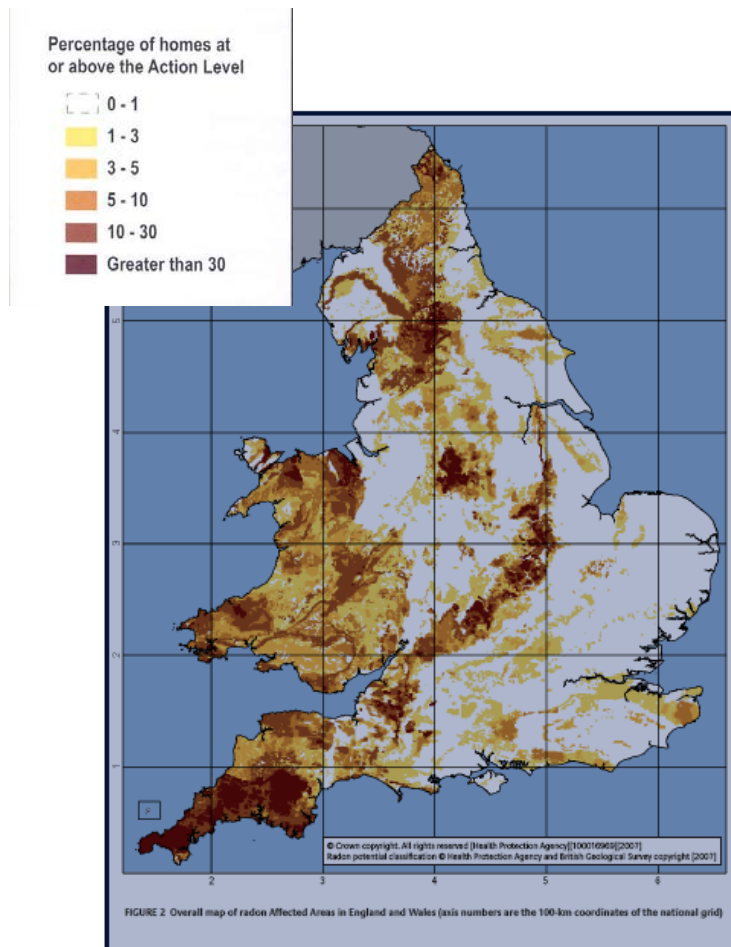
November 2007 -

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Radon risks



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Radon risks



Effect of high radon

Increases with an individuals' natural risk so is significantly greater for smokers.

Exposure level

Within the same building, exposure varies with usage factors, such as occupancy times and durations, heating, ventilation, ground level.

Potential for significant risks which can change dramatically with significant change of use.

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Workplace risks

5-7% of lung cancer deaths, approximately 2,000 people per year total (cf. asbestos disease fatalities 3,000/ yr)

160,000 workplaces in affected areas

16,000 workplaces > action level

90 to 280 lung cancers per year from occupational exposure in UK

< 5% lung cancer 'curable'

Feb 05 - S Darby research re risks



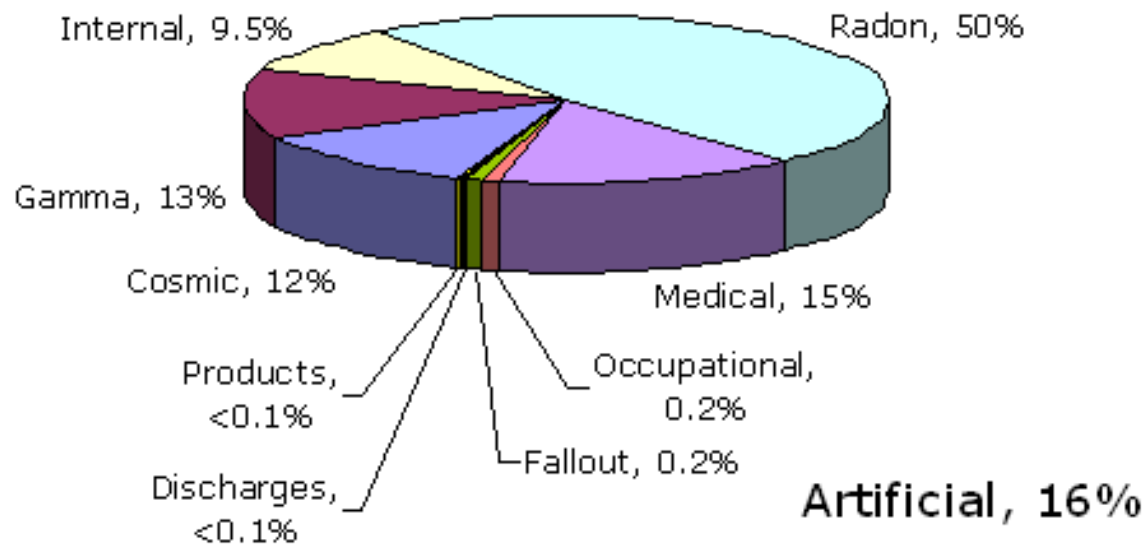
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Workplace risks

Natural, 84%



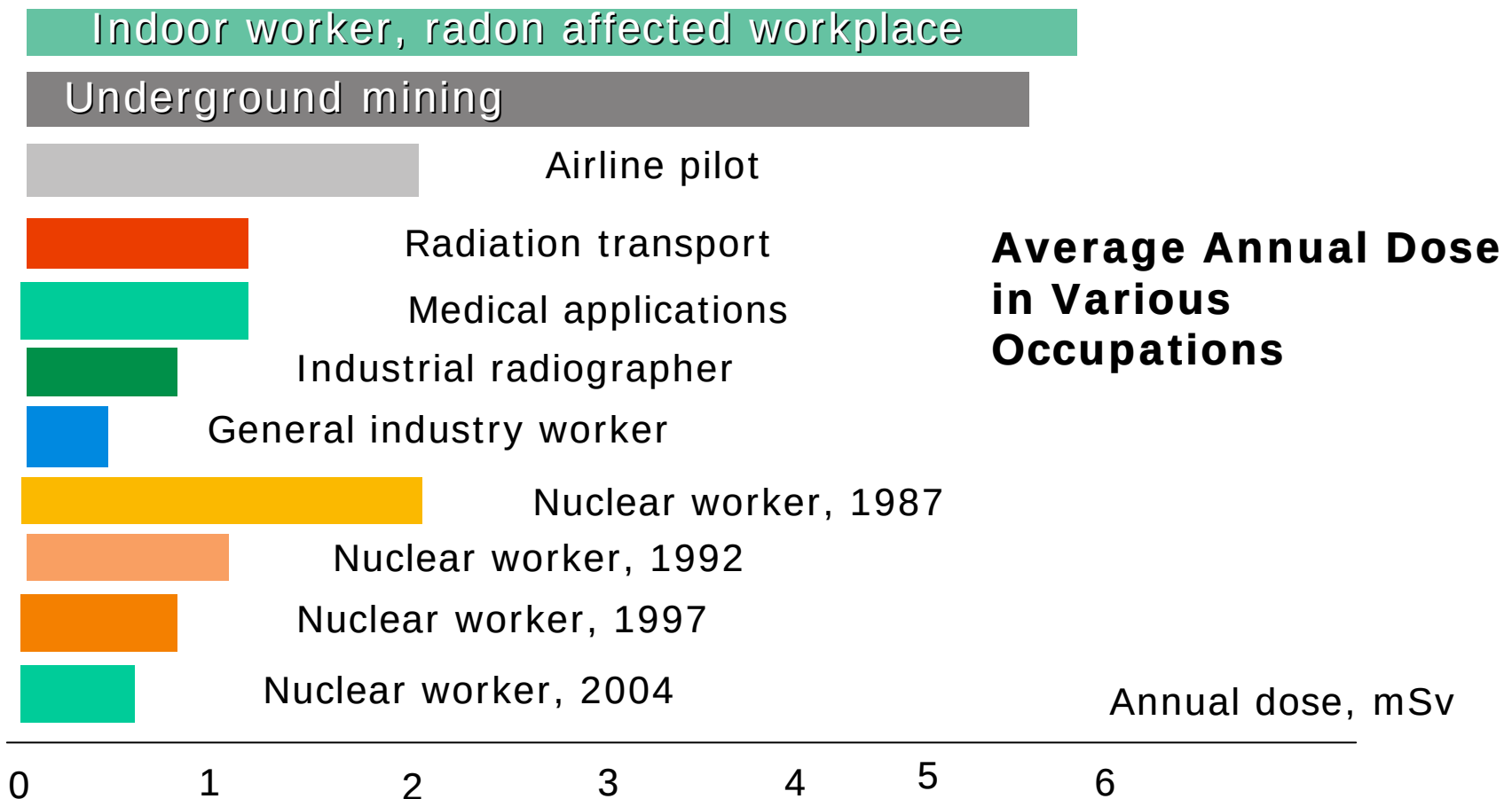
Radon contributes 50% of the annual radiation dose to the average individual in the UK

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Workplace risks



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Workplace risks

10 major carcinogens in UK workplaces:

- Crystalline silica
- Radon
- Passive tobacco smoke
- Solar radiation
- Diesel exhaust
- Wood dust
- Benzene
- Ethylene dibromide
- Inorganic lead compounds
- Chemicals used in hairdressing

83% of total
number of
employees
exposed

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Workplace risks

10 -20 major (respiratory) carcinogens:

- decorating paints
- chromium IV compounds
- tetrachloroethylene
- coal tar products
- iron & steel foundries
- asbestos
- formaldehyde
- nickel compounds
- acid mists
- cadmium containing compounds

14% of total
number of
employees
exposed

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Legal requirements for workplaces

In all workplaces in affected areas.....



All employers must assess risks of radon (MHSWR)

Usually requires measurement



- If above action level of 400 Bq/m³ (IRR99)

Must take IMMEDIATE action:

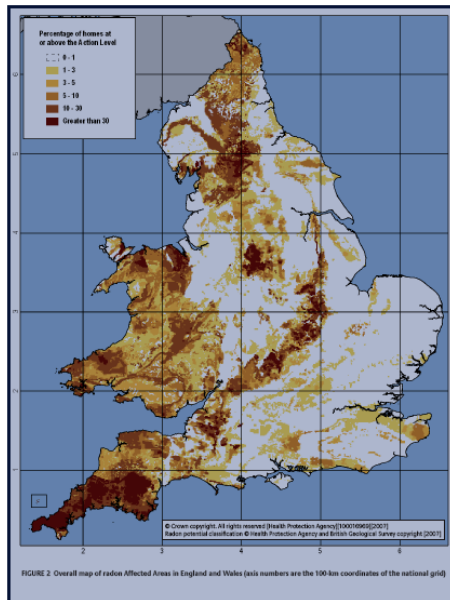
- ◆ Usually remediation of building to < action level (unless very low occupancy levels)

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Find it !

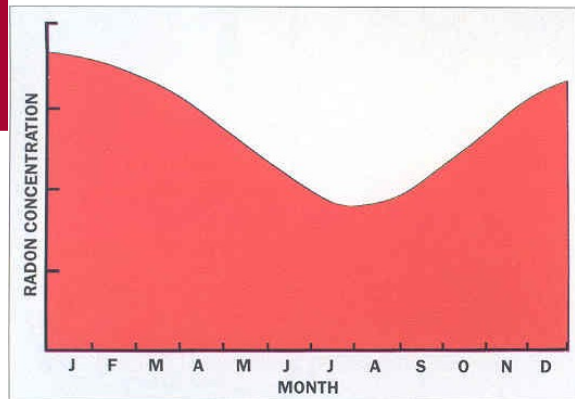


Affected Areas refer to existing **houses**
- HPA research indicates almost identical maps for workplaces.



Passive radon detectors
- 3 month measurement

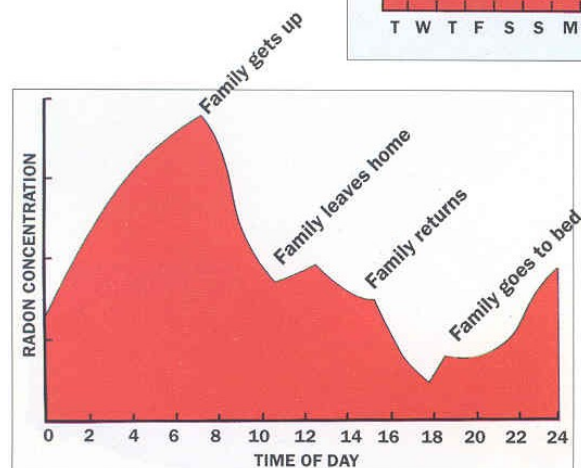
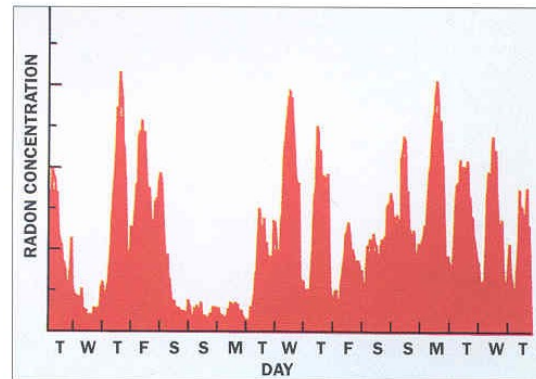
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Radon levels indoors vary from season to season.

Find it !

Radon levels indoors vary from day to day.



Radon levels indoors vary from hour to hour as windows and doors are opened and closed during the day.

Radon levels indoors changes over the year, month, and day

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Fix it !

The method of dose limitation depends on the circumstances

- **prevention** for proposed new structures
- **cure** (mitigation) for existing buildings.

A range of standard building remediation options available.

Remediated buildings are usually significantly below action level.

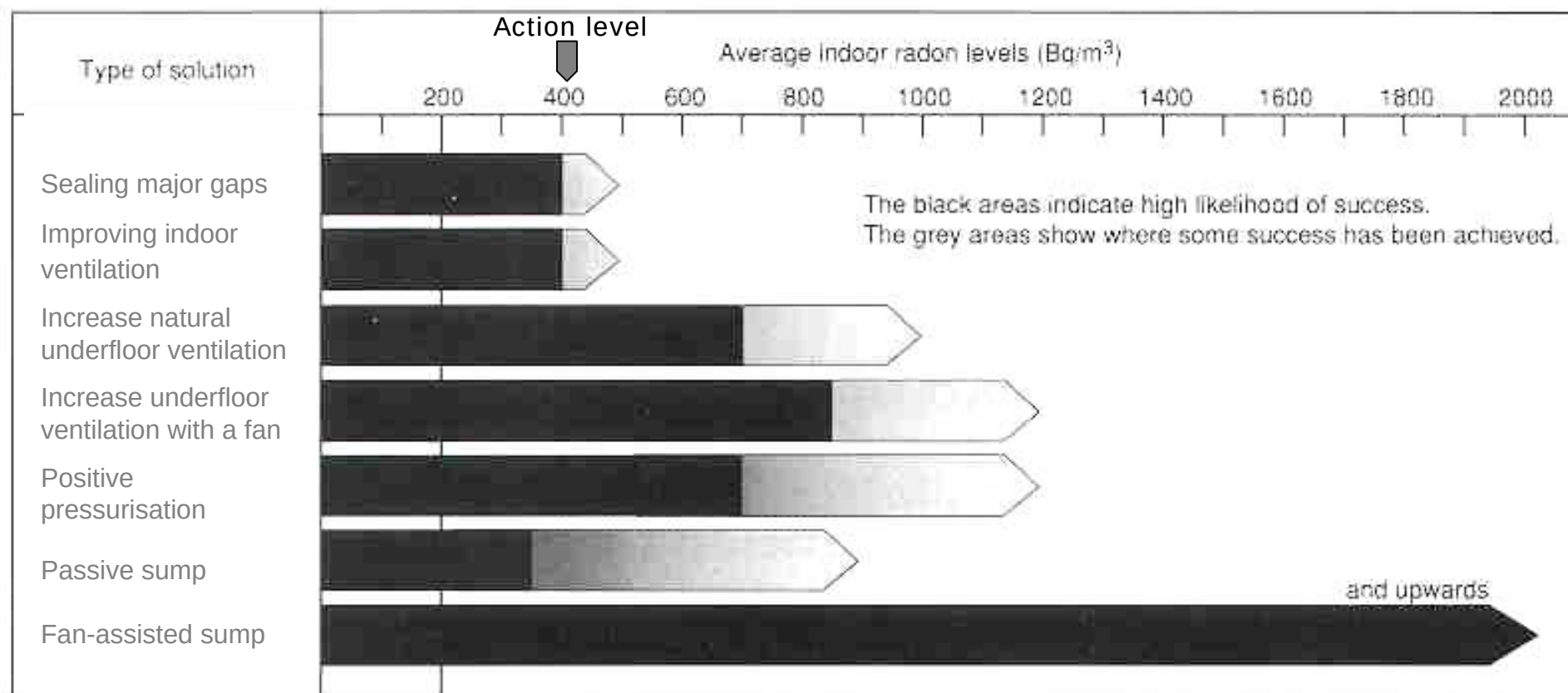
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Fix it !

Reductions achievable from different solutions



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Fix it !

Simple sealing

- Worth sealing large openings only
- Ensure no vents cut through floor - seal or replace with alternative

Typical large
opening
beneath bath



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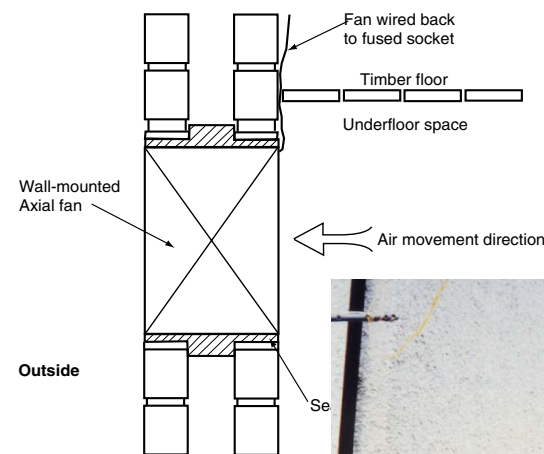


Fix it !

Natural & Mechanical underfloor ventilation



Obstructed underfloor vents



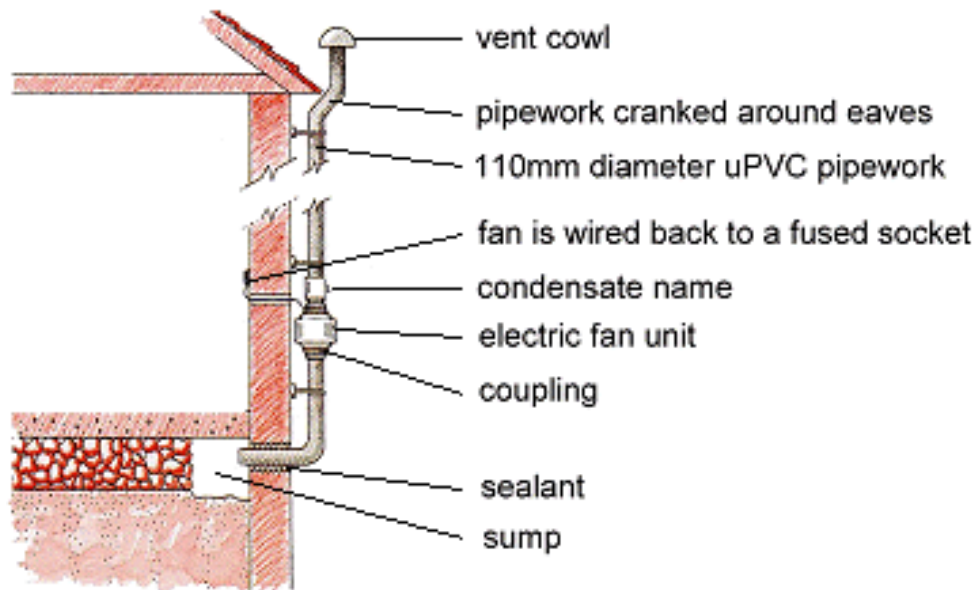
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Fix it !

Externally excavated mini-sump system



A typical external sump



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Fix it !

Positive pressurisation



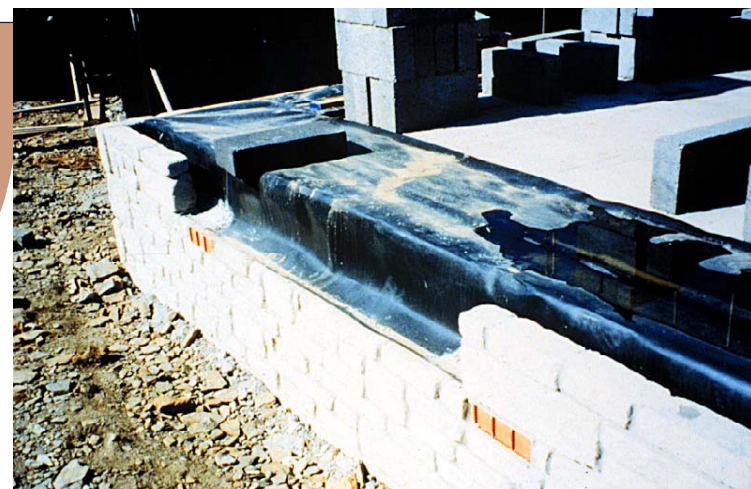
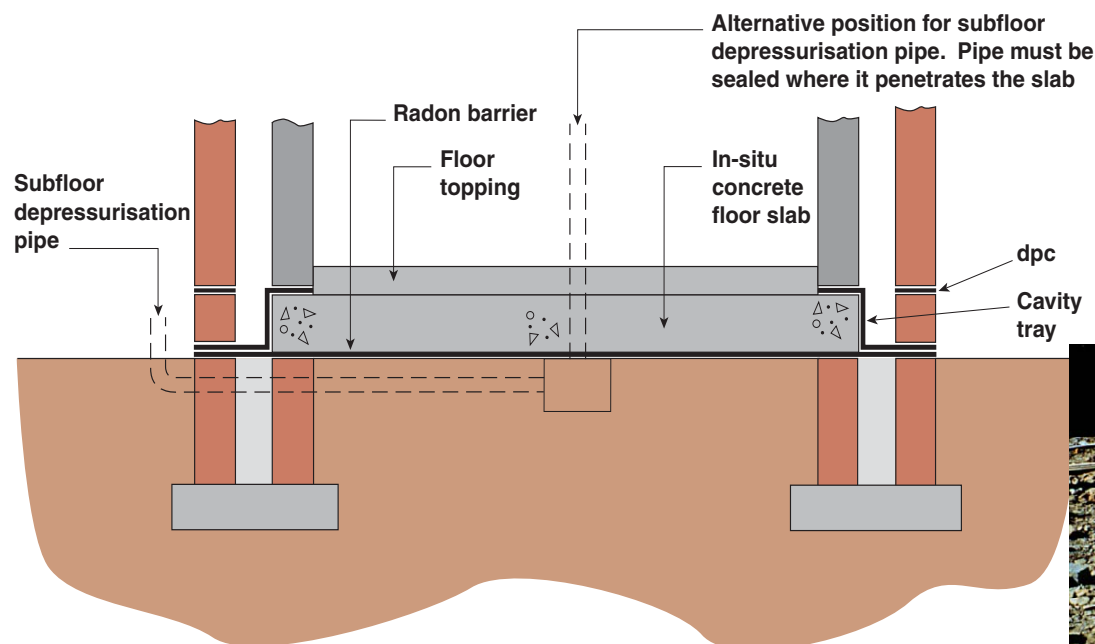
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Fix it !

Full radon protection in in-situ or ground supported concrete floor
(barrier under slab) **Protection in new buildings (> 1999)**



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Enforcement past and present

**Employers
awareness:**



National enforcement 1985 – 2005 =



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HSE / LA enforcement strategy

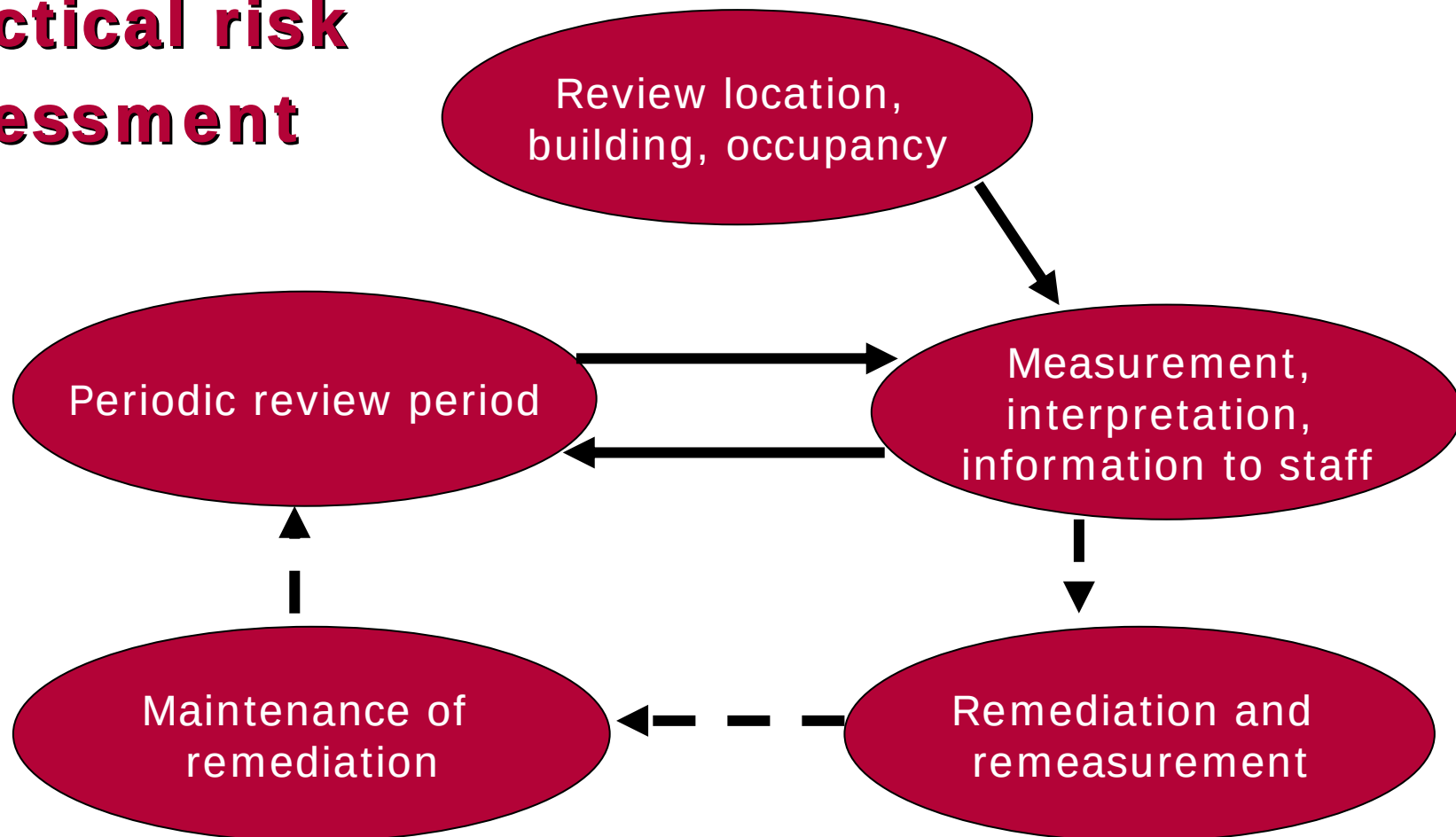
- ❖ Target employers *in radon affected areas*
- ❖ Raise employers awareness of risk of lung cancer from radon in the workplace
- ❖ Employers responsibility for protecting employees
- ❖ Provide advice & direction
- ❖ Require appropriate risk assessment/ measurement
- ❖ Require any necessary remedial action
- ❖ Inform employees & encourage home measurements

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Practical risk assessment



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Current enforcement Workplan

HSE Radiation Team (Non-nuclear)

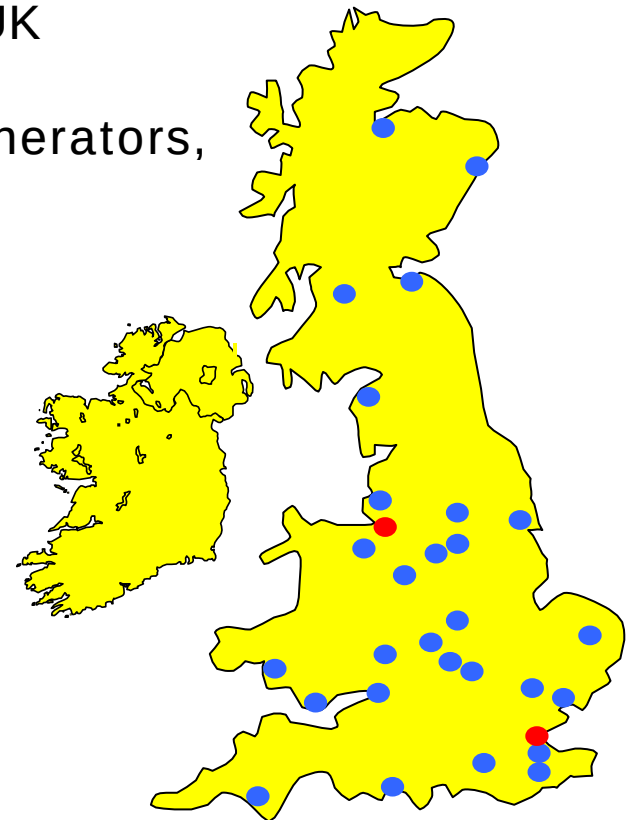
8 Specialist Inspectors based around UK

Assist ~ 600 General Inspectors

Covering: Radioactive materials, radiation generators,
non-ionising radiations

1. Inspection
2. Investigation
3. Advice
4. Cross-government
5. National programmes
6. Commissioning research
7. Development of regulations

Radon



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HSE Workplan

Strategy 2005 – 2010

Aim

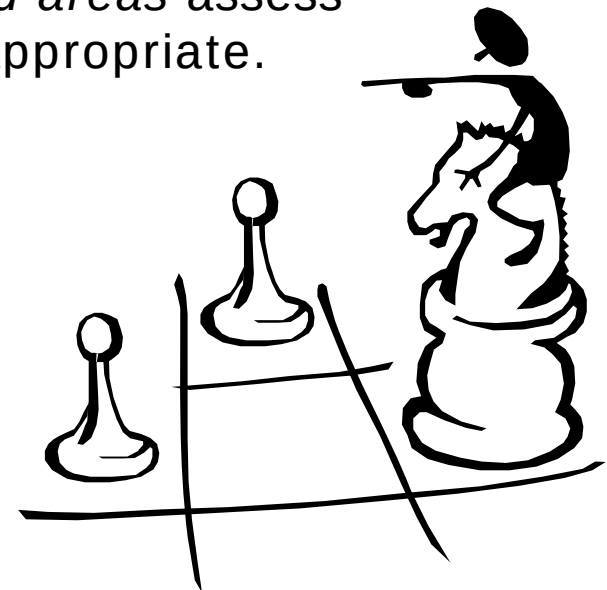
Reduce incidences ill health caused by exposure to radon at work by ensuring that all employers *in affected areas* assess the risks and effectively remediate where appropriate.

Targets

50% of workplaces assessed risk by 2010.
(2002 baseline 8%)

Methods

14 planned interventions.



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HSE Workplan

Strategy 2005 – 2010

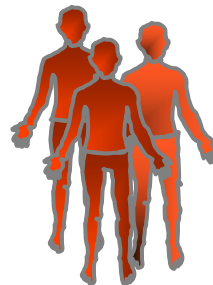
A. Provision of information and advice



**B. Working with stakeholders and
intermediaries**



**C. Direct contact with
employers**



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Schools project proposal

Aim: To ensure that no individual is exposed to excessive levels of radon.

Method: Phase 1 = Information to identified LEAs & schools

[Phase 2 = Measurement and remediation of buildings]

Project objective [Phase 1]:

Working with DCSF, DoH, WAG, SE & HPA, provide an information and assessment tool, specific to individually affected schools, enabling radon risk assessment, measurement and remediation where appropriate.

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Schools project proposal

Estimated number of schools involved:	England	Wales
Primary & secondary schools:	20,000	1,900
No. in radon affected area	4,000	1,100
Schools already monitored by HPA	<u>-1,500</u>	<u>< 10</u>
 Total schools requiring radon monitoring	 2,500	 1,100
 Schools likely to have excessive levels	 250	 80

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Schools project proposal

Project outline

Through established communication channels:

- Provide duty holders with sufficient information to take appropriate action through an information pack/ handbook that is:
 - specific to LA/ LEA areas where one or more schools are in a radon AA;
 - contains a list naming each school in that area that is in a radon AA;
 - details the potential of each of these schools finding radon levels above the action level;
 - describes risks to health, legislative requirements, methods of measurement, interpretation of results, overview of remediation techniques; and
 - provides guidance where to find detailed advice on radon control within buildings.
- Provide a dedicated website to help duty holders and inform others.

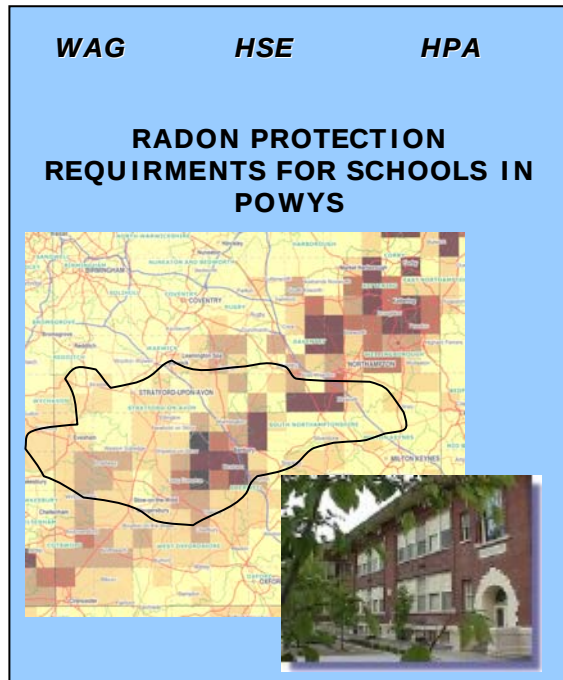
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Schools project proposal

Example HPA information pack:



Contents	
1.	What is radon
2.	Health risks in schools
3.	Legal requirements
4.	School risk assessment
5.	Doing measurements
6.	Informing schools
7.	Informing parents
8.	Interpreting results
9.	Remediation of buildings
10.	Further information

SCHOOLS IN POWYS REQUIRED TO TAKE IMMEDIATE ACTION	
Aaaa Primary	Mmmmm Primary
Eeeeeee Primary	Pppppp Primary
Eeeeeee School	Rrrrr Primary
Hhhhh Junior	Rrrrrrr Rrrr Junior
Jjjjjj Jj Primary	Sssss Primary
Kkkk School	Ssss Sssss School
Llllll Primary	Ttttt Primary
Llllll Lllllll Junior	Wwww Junior
Mmmmm School	Www Wwww School

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Schools project proposal

Implications for LEAs with identified schools

1. Inform school heads & governors
 2. Order and site appropriate number of dosimeters
(~£210 per primary, ~£1000 per secondary)
 3. Collection of dosimeters and return
 4. Receipt of and interpretation of results
 5. Communication planning
 6. Informing schools of results (and plans for reducing high levels)
 7. Remediation of buildings and information for parents
(~£5k per large building)
 8. Remeasurement of remediated buildings
 9. Long term surveillance planning
-

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Interventions

Conclusions - overall



Up to 2000 potential lung cancer deaths per year in UK.

Radon can be a major source of radiation exposure in some schools.

Only 1/4 of Welsh schools in high radon areas have measured radon levels.

Solutions can usually be found without excessive cost.

The risks are significant and justify resource allocation on range of interventions.

Increased awareness and enforcement of the legislation in schools may encourage more people to consider radon in their homes.