

**Householder's response to the radon risk : summary report / Department of the Environment.**

**Contributors**

Great Britain. Department of the Environment.

**Publication/Creation**

London : H.M.S.O., 1994.

**Persistent URL**

<https://wellcomecollection.org/works/vep6k6qy>

**License and attribution**

You have permission to make copies of this work under an Open Government license.

This licence permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Image source should be attributed as specified in the full catalogue record. If no source is given the image should be attributed to Wellcome Collection.



Wellcome Collection  
183 Euston Road  
London NW1 2BE UK  
T +44 (0)20 7611 8722  
E [library@wellcomecollection.org](mailto:library@wellcomecollection.org)  
<https://wellcomecollection.org>

---

---

# Householders' Response to the Radon Risk: Summary Report

---

---

WELLCOME  
LIBRARY

P

7158



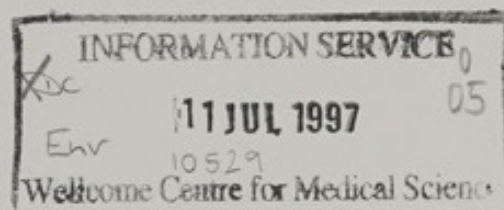
22501104202

Department of the Environment

## Acknowledgements

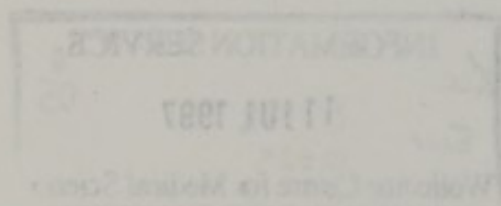
This study was commissioned by the Department of the Environment and was undertaken by Professor Lee of the Environmental Psychology and Policy Research Unit, University of St Andrews.

# Householders' Response to the Radon Risk: Summary Report



© Crown copyright 1994  
Applications for reproduction should be made to HMSO  
First published 1994  
Second impression 1994  
ISBN 0 11 752901 X

# Householders' Response to the Radon Risk: Summary Report



London: HMSO

# Acknowledgements

## 1 Introduction

This study was commissioned by the Department of the Environment and was undertaken by Professor Lee of the Environmental Psychology and Policy Research Unit, University of St Andrews.

We would like to thank the householders who assisted in this study for their participation in interviews, discussion groups and completion of questionnaires. We are also grateful to the Environmental Health Officers of the sixteen local authorities in Cornwall and Devon for information on local policy and practice.

## 2 Radon Publicity Campaign

Publicity and measurement	3
Guidance on remediation	3

## 4 Outline of the Investigation

Objectives	7
Questionnaire survey	7
Interview survey	8

## 5 The Route to Remediation

Receiving the advice	11
Applying for reimbursement	12
Returning quotes	12
Attending a radon visit	12
Seeking advice	12
Source of advice	12
Acting on advice	13

---





# CONTENTS

<b>1 Introduction</b>	<b>1</b>
Background	1
<b>2 Main Findings</b>	<b>3</b>
Reading the campaign leaflet	3
Applying for measurement	3
Undertaking remedial work	3
Future intention to remediate	3
Recommendations	4
<b>3 Radon Publicity Campaign</b>	<b>5</b>
Publicity and measurement	5
Guidance on remediation	5
<b>4 Outline of the Investigation</b>	<b>7</b>
Objectives	7
Quantitative surveys	7
Qualitative surveys	8
<b>5 The Route to Remediation</b>	<b>11</b>
Reading the leaflet	11
Applying for measurement	12
Returning detectors	12
Above the action level	12
Seeking advice	12
Sources of advice	12
Acting on advice	13



<b>6 Factors Influencing Remediation : Methodology</b>	<b>15</b>
Analysis of attitudinal factors	15
Principal components analysis	15
 <b>7 Factors Influencing Remediation : Results</b>	 <b>19</b>
Reading the campaign leaflet	19
Application for measurement	19
Seeking help or advice	21
Concern over property values	21
Partial or DIY measures	22
Undertaking full remedial measures	22
Future intention to remediate	24
Combining the variables to achieve the best prediction	24
 <b>8 Communication of Information about Radon</b>	 <b>27</b>
Evaluation of the campaign leaflet	27
Recall and evaluation of the 'measuree' package	27
The 'mass media'	28
 <b>9 Survey of Environmental Health Officers</b>	 <b>29</b>
Local grant policies	29
 <b>10 Recommendations</b>	 <b>31</b>
Increasing measurement take-up	31
Increasing knowledge about radon	31
Increasing remedial action publicity	32
Costs of remediation	33
Property market	33

## Tables

### 1 Introduction

Table 1	The Route to Remediation	11
Table 2	Sources of Advice	13
Table 3	Factor Analysis of the Fourteen Attitude Statements	16
Table 4	Household Interview Survey : Attitudinal Showcard	17
Table 5	Reasons Given For Not Applying for a Free Measurement	20
Table 6	Reasons Given by those Above Action Level for Not Taking Specific Actions	23
Table 7	Discriminant Function Analysis : Ranked Discriminant Scores for 22 Variables	25
Table 8	Survey of Environmental Health Officers (1992) compared to IEHO survey (1991)	30

## Background

1.04 A major publicity campaign was launched by the Department of Environment in March 1991 to encourage all householders in Cornwall and Devon to apply for free radon measurements. However, by the end of 1991 only approximately 12% of households had taken advantage of the service.

1.05 Prompted by the take up, the Department of Environment commissioned a research project in January 1992 to investigate householders' attitudes to radon. The results of the research are summarised in this paper. A full description of the results is provided in a supplementary report 'Householders' Responses to the Radon Risk Technical Report'.

10	Methodology
11	1.1. The Radon Problem in Sweden
12	1.2. Goals of the Study
13	1.3. Factor Analysis of the Questionnaire
14	1.4. Attitude Statements
15	1.5. Results: Attitudes and Behavior
16	1.6. Summary
17	2. Results: Attitudes and Behavior
18	2.1. Attitudes and Behavior
19	2.2. Attitudes and Behavior
20	2.3. Attitudes and Behavior
21	2.4. Attitudes and Behavior
22	2.5. Attitudes and Behavior
23	2.6. Attitudes and Behavior
24	2.7. Attitudes and Behavior
25	2.8. Attitudes and Behavior
26	2.9. Attitudes and Behavior
27	2.10. Attitudes and Behavior
28	2.11. Attitudes and Behavior
29	2.12. Attitudes and Behavior
30	2.13. Attitudes and Behavior

## 3. Communication of Information about Radon

31	3.1. Evaluation of the campaign
32	3.2. Recall and evaluation of the "measured" package
33	3.3. The "mass media"

## 4. Survey of Environmental Health Officers

34	4.1. Local radon levels
----	-------------------------

## 5. Recommendations

35	5.1. Up-to-date information
36	5.2. Radon levels and exposure
37	5.3. Public information
38	5.4. Costs of remediation
39	5.5. Property market

# 1 Introduction

1.01 Radon is a colourless, odourless, but radioactive gas, formed by the decay of uranium which is present at trace levels in most rocks and soils. The gas normally diffuses into the open air and is dispersed harmlessly. However, it can accumulate in buildings because of small pressure differences between the air inside buildings and that outside. Exposure over long periods to high levels of the gas is known to be a cause of lung cancer.

## Background

1.02 Extensive measurement by the National Radiological Protection Board (NRPB) of radon in homes, carried out on behalf of the Department of Environment (DOE), has shown that levels are highest in Cornwall and Devon, followed by Derbyshire, Northamptonshire and Somerset.

1.03 The recommended Action Level, i.e. the radon level at which householders are advised to undertake remedial action, is 200 becquerels per cubic metre ( $\text{Bq/m}^3$ ). Cornwall and Devon, Northamptonshire and parts of Derbyshire and Somerset, in which exploratory surveys indicated that 1% or more of houses were above the Action Level, have been formally designated as Affected Areas. Within these areas, radon preventive measures are required in new homes by the Building Regulations. Householders in Affected Areas are also encouraged to have their houses measured for radon.

1.04 A major publicity campaign was launched by the Department of Environment in March 1991 to encourage all householders in Cornwall and Devon to apply for free radon measurements. However, by the end of 1991 only approximately 12% of households had taken advantage of the service.

1.05 Prompted by this low take up, the Department of Environment commissioned a research project in January 1992 to investigate householders' attitudes to radon. The results of this research are summarised in this paper. A full discussion of the results is contained in a supplementary report 'Householders' Responses to the Radon Risk: Technical Report'.

## Future intention to remediate

2.06 About one-quarter of householders above the action level said that they intended to undertake remedial work within a year and about the same number "in the next few years". Those who were concerned about their property values were more likely to plan future remedial work in the short term, and those who were concerned about their health were more likely to plan remediation in the long term.



## 1 Introduction

1.01 Radon is a colourless, odourless, but radioactive gas, formed by the decay of uranium which is present at trace levels in most rocks and soils. The gas normally diffuses into the open air and is dispersed harmlessly. However, it can accumulate in buildings because of small pressure differences between the air inside buildings and that outside. Exposure over long periods to high levels of the gas is known to be a cause of lung cancer.

1.02 Extensive measurement by the National Radiological Protection Board (NRPB) of radon in homes, carried out on behalf of the Department of Environment (DOE), has shown that levels are highest in Cornwall and Devon, followed by Derbyshire, Northamptonshire and Somerset.

1.03 The recommended Action Level, i.e. the radon level at which householder are advised to undertake remedial action, is 200 picocuries per cubic metre (Bq/m<sup>3</sup>). Cornwall and Devon, Northamptonshire and parts of Derbyshire and Somerset, in which exploratory surveys indicated that 1% or more of houses were above the Action Level, have been formally designated as Affected Areas. Within these areas, radon preventive measures are required in new houses by the Building Regulations. Householders in Affected Areas are also encouraged to have their houses measured for radon.

1.04 A major publicity campaign was launched by the Department of Environment in March 1991 to encourage all householders in Cornwall and Devon to apply for free radon measurement. However, by the end of 1991 only approximately 12% of householder had taken advantage of the service.

1.05 Prompted by this low take up, the Department of Environment commissioned a research project in January 1992 to investigate householder's attitudes to radon. The results of this research are summarised in this paper. A full discussion of the results is contained in a supplementary report 'Householder's Response to the Radon Risk Technical Report'.

## Background

## 2 Main Findings

### Reading the campaign leaflet

### Applying for measurement

### Undertaking remedial work

### Future intention to remediate

2.00 The main findings were as follows:-

2.01 Approximately half of the households surveyed either did not read or did not recall receiving the DOE campaign leaflet 'Radon in Houses'. Failure to read the leaflet reduced the number who make a conscious decision whether to apply for the free radon measurement.

2.02 Those that applied for the free radon measurement were more likely to be elderly, retired, have higher incomes and come from social groups A and B. Those who were concerned about health or property values were also more likely to apply.

2.03 Those who did not apply, after excluding those who had not read the leaflet, were more likely to disbelieve or deny the existence of radon and its health risk, and to a lesser extent to cite the expected cost of remedial work as a deterrent.

2.04 Very few households that had applied for a radon measurement and had a reading over the recommended Action Level had actually undertaken remedial work. The high cost of remediation was the main reason cited by householders for this.

2.05 The age of the householder was also influential; young householders felt that there was a leisurely timescale for action whilst elderly householders felt it was too late to remedy the health risk. Those least likely to take action were on low income, aged over 45 and working.

2.06 Those that had undertaken remedial work tended to be motivated by their concern over their property values.

2.07 The Department's campaign leaflet and package of information was generally felt to be helpful, but there was little differentiation between the pamphlets by respondents.

2.08 About one-quarter of householders above the Action Level said that they intended to undertake remedial work within a year and about the same number "in the next few years". Those who were concerned about their property values were more likely to plan future remediation work in the short term, and those who were concerned about their health were more likely to plan remediation in the long term.

2.09 Overall, the attitude of concern about property values was the best predictor of remediation behaviour.

## Main Findings

### Recommendations

2.10 Recommendations were made in three main areas – increasing measurement take-up, improving knowledge about radon and increasing remedial action.

Reading the  
campaign leaflet

Applying for  
measurement

Undertaking  
remedial work

Future intention to  
remediate



### 3 Radon Publicity Campaign

#### Publicity and measurement

3.01 An extensive publicity campaign was launched in Cornwall and Devon in March 1991, combined with a confidential free measurement service. In 1992, the service was extended to Derbyshire and Northamptonshire and a similar campaign is planned for Somerset in 1994.

3.02 The campaign is led by an 'eye-catching' pamphlet entitled 'Radon in Houses', delivered to every household in Cornwall and Devon in March 1991. This gives outline details of the problem and invites householders to apply for a free measurement. Those responding are sent two small yellow disc detectors which have to be placed, one in the living room and one in an occupied bedroom, and returned to NRPB after a period of three months.

3.03 To support the free measurement campaign, publicity posters have been displayed in doctors' surgeries, estate agents' offices, public libraries, DIY shops and so on. The government approach has also been supplemented by informative articles and programmes in the media.

3.04 Householders who apply for and then return the detectors receive a note of their measurement level within a few weeks. This is accompanied by a colourful fold-out pamphlet entitled 'Radon' published by NRPB in their 'At-a-Glance' series. They are also sent the leaflet 'Radon, Questions and Answers', which deals with the main issues in an easy-to-understand format. Finally, they are sent the 'The Householders' Guide to Radon', a small booklet giving the more detailed technical information and DIY advice that is needed by those who are considering remedial action.

#### Guidance on remediation

3.05 At the time that fieldwork was carried out, this 'Householder's Guide' was in its second edition. Since that time, a revised third edition has been introduced by the DOE. The main revisions include the removal of the suggested timescale for remediation; the inclusion of a more detailed breakdown of potential costs of remediation; and the addition of more information on where to go for advice including the BRE Radon Hotline and how to choose a builder.

3.06 The Householders' Guide was produced in close collaboration with the Government's Building Research Establishment (BRE) which has carried out extensive research on alternative forms of remediation and whose direct advice is also made available, without charge, in particularly severe cases (above 1500 Bq/m<sup>3</sup>). The BRE also provides, firstly, a telephone 'hotline' which anyone may use and, secondly, a series of technical publications and courses to assist builders and building professionals.

3.07 Local authorities have powers to give discretionary renovation grants for radon remedial measures. Discretionary renovation grants are means tested but can be given to cover 100% of the costs of such works in appropriate cases.

3.01 An extensive publicity campaign was launched in Cornwall and Devon in March 1991, combined with a confidential free measurement service. In 1992, the service was extended to Dorsetshire and Hampshire and a similar campaign is planned for Somerset in 1994.

3.02 The campaign is led by an 'eye-catching' pamphlet entitled 'Radon in Houses', delivered to every household in Cornwall and Devon in March 1991. This gives outline details of the problem and invites householders to apply for a free measurement. Those responding are sent two small yellow disc detectors which have to be placed, one in the living room and one in an occupied bedroom, and returned to NRPB after a period of three months.

3.03 To support the free measurement campaign, publicity posters have been displayed in doctors' surgeries, estate agents' offices, public libraries, DIY shops and so on. The government approach has also been augmented by informative articles and programmes in the media.

3.04 Householders who apply for and then return the detectors receive a note of their measurement level within a few weeks. This is accompanied by a colour-coded 'fold-out pamphlet' entitled 'Radon: Questions and Answers', which deals with the main issues in an easy-to-understand format. Firstly, they are sent 'The Householders' Guide to Radon', a small booklet giving the more detailed technical information and DIY advice that is needed by those who are considering remedial action.

3.05 At the first fieldwork was carried out, the Householders' Guide was in its second edition. Since that time, a revised third edition has been introduced by the DOE. The main revisions include the removal of the suggested timescale for remediation; the inclusion of a more detailed breakdown of potential costs of remediation; and the addition of more information on where to go for advice including the BRE Radon Hotline and how to choose a builder.

3.06 The Householders' Guide was produced in close collaboration with the Government's Building Research Establishment (BRE) which has carried out extensive research on alternative forms of remediation and whose direct advice is also made available, without charge, in particularly severe cases (above 100 Bq/m<sup>3</sup>). The BRE also provides, firstly, a telephone hotline, which anyone may use and, secondly, a series of technical publications and courses for specialist buyers and building professionals.

Publicity  
and  
measurement

Guidance on  
remediation



## 4 Outline of the Investigation

4.01 The main aims of the investigation were to survey householders in the radon Affected Areas of Cornwall and Devon to estimate what proportions have taken (or not taken) the various steps on the route to radon remediation, and to explore the factors influencing behaviour at each step.

### Objectives

4.02 These steps are : first, to read the leaflet and apply for measurement; then to return the detectors; to seek advice if above the Action Level; to carry out DIY or for 'full' remedial measures to obtain an estimate for building alterations; to carry out these building alterations and to finally confirm their success with a second measurement.

4.03 Other important objectives were to evaluate the effectiveness of the publicity campaign; and to determine the extent to which remedial action could be predicted from a wide range of socio-demographic and attitudinal variables.

### Quantitative surveys

4.04 Following a pilot study, a postal survey and an interview survey of householders were carried out. These two surveys provide the basis for most of the statistical analysis presented in the report.

4.05 The **Postal survey** comprised two separate sub-samples – households that had applied for radon measurements (referred to as 'measures') and those that had not ('non-measures'). The sampling for the postal survey was designed to achieve completed returns for a minimum of 2,000 measures (comprising 1,500 above the Action Level and 500 below the Action Level) and 500 non-measures. Each of the sub-samples of above the Action Level, below the Action Level and non-measures were matched by postcode to ensure similar distributions of housing stock. The samples of measures were extracted from records held by the NRPB, and confidentiality was maintained as the NRPB were responsible for extracting information from their database and transferring the information to the researchers under coded reference. The smaller sample of non-measures was selected from a post office address file of unknown 'occupiers'. The questionnaires were posted out in late March 1992, and a three week response period was allowed. After this reminder letters were sent in order to boost the response rates to reach the target numbers.

4.06 The **Interview survey** was carried out after the postal survey and focus group discussions (described below) had been undertaken, in order to incorporate issues arising from these into the questionnaire design. The sampling size for the interview survey was designed to ensure completed returns from 500 households, and was to be representative of both the distribution of radon and socio-economic characteristics of the population. A representative sampling frame was desirable in order to provide a yardstick against which the postal survey could be measured, thus ensuring that any 'volunteer bias' in the postal survey was allowed for. A

reasonable sized sub-sample of 'measurers' and potential 'remediators' (households who had undertaken remedial work) was also required yet these comprised only a minority of households on the sampling frame. The sample size was therefore increased in order to yield more 'measurers' interviews. The sampling frame for the household interview survey was based on selected post-code sub-areas of high, medium and low average radon levels, and within these areas, interviewers fulfilled quotas (as near as possible) for age and social group based on the South West profile. The interviews were carried out by a social research agency during late July and early August 1992.

4.07 The achieved sample sizes for the two main surveys were as follows: -

#### Postal Survey

Non-measurers	621
Measurers	
Below Action Level	1,211
Above Action Level	1,335
Detector not returned	80
<b>Total</b>	<b>3,247</b>

#### Interview Survey

Non-measurers	587
Measurers	
Below Action Level	97
Above Action Level	73
Detector not returned	6
<b>Total</b>	<b>736</b>

### Qualitative surveys

4.08 In addition, a number of **'qualitative' surveys** were undertaken by the research team, which aimed to explore more generally the local householders' attitudes towards radon and the publicity campaign. Numbers in these surveys were small, and thus cannot provide representative statistical evidence, yet they do give an increased understanding of the way people think, feel and behave. These smaller surveys comprised:-

- (i) five **'focus' discussion groups**, averaging 8 'measurers' in each group, which aimed to explore attitudes to radon from an interactive exchange of discussion. Letters were sent by the NRPB to 160 households that had a radon measurement carried out, inviting them to attend a discussion group run by the research team in either Falmouth or Barnstaple in June 1992. Recordings were made of the discussions which centred on several key themes such as concerns about health, comparison with other risks, the campaign, measurement and remediation experiences.
- (ii) extended **face-to-face recorded interviews** with 21 'measurers', which allowed greater exploration of their attitudes to radon and experiences than was possible with the household interviews. A sample of approximately 70 households was gained from the NRPB



records of households with high levels of radon, and of these 21 households took part in these interviews which were undertaken in July 1992.

- (iii) a small telephone **survey of Environmental Health Officers**, based in the 16 local authorities in the South West, which aimed to gain information on the policies towards radon and radon grants, and to compare results with the survey carried out in April 1991 by the Institution of Environmental Health Officers.

Table 1 The Route to Remediation

	Interviewing Survey Measured & Non-Measured	Postal Survey Measured	Postal Survey Non-measured
Sent Leaflet	763 62%		621 54%
Received Replying Leaflet	464 67%		334 54%
Reply Leaflet	471 41%		243
Applied for Measurement	119 49%	2628 37%	
Valium Detected	170 49%	2544 39%	
Applied Action Leaflet	79 19%	1003 21%	
Applied Action	141 33%	302 (22%) 38%	
Grants Available	8 32%	107 (8%) 76%	
Detected Remedial Work	7 100%	51 (8%) 37%	
Control by Management	2 100%	40 (4%)	

NS.

The figures in parentheses show the percent of households at the initial stage. The figures in parentheses show the percentage of households that have taken the action level. The figures in parentheses show the percentage of households that have taken the action level.

## Reading the leaflet

5.02 Probably the most reported result of both surveys is that a high proportion of households felt easy at the initial stage, i.e. they do not remember receiving the leaflet or do not read it, so that only about half appear to make a conscious decision whether or not to apply for measurement.



## 5 The Route to Remediation

5.01 **Table 1** shows the proportions who took each step along the route to remediation. Despite the different sampling and elicitation methods, there is quite close agreement between the postal and interview samples. The percentage above the Action Level is higher in the postal survey than in the interview survey (52% v 43%), probably reflecting a voluntary response bias. However, all other results are remarkably similar across the two surveys.

**Table 1 The Route to Remediation**

	Interview Survey Measures & Non-Measures		Postal Survey Measures	Postal Survey Non-measures
Sent Leaflet	763			621
	63%			54%
Remember Receiving Leaflet	484			338
	83%			84%
Read Leaflet	401			283
	44%			
Apply for Measurement	176		2626	
	97%		97%	
Return Detectors	170		2546	
	43%		52%	
Above Action Level	73		1335	
	19%		22%	
Seek Advice	14	(19%)	292	(22%)
	43%		36%	
Obtain Estimate	6	(8%)	107	(8%)
	33%		76%	
Undertake Remedial Work	2	(3%)	82	(6%)
	100%		60%	
Confirm by Measurement	2	(3%)	49	(4%)

N.B.

The figures between each stage show the percent who went on to the next stage. The figures in parentheses show the percentages of all households above the action level. Partial/DIY actions are not included because more than one could have been taken.

### Reading the leaflet

5.02 Probably the most important result of both surveys is that a high proportion of households fall away at the initial stage, i.e. they do not remember receiving the leaflet or do not read it, so that only about half appear to make a conscious decision whether or not to apply for measurement.



## Applying for measurement

5.03 Of the total interview sample of 763 households, 23% applied for measurements, 43% of those returning detectors being above the Action Level. The number applying for measurement in the interview survey (23%) is significantly higher than in the campaign as a whole (where it is 12-14%) because the sample was drawn mainly from medium and high radon areas in order to maximise the number of remediators.

5.04 The postal sample was stratified in advance in order to secure a large sample of measurees. Hence, the proportion of measurees (all of whom were drawn from the NRPB records) is no guide to the proportion in the wider population. Of the total 3,247 in the postal survey, 2,626 households had applied for measurements and 1,335 (52% of those returning detectors) were above the Action Level.

## Returning detectors

5.05 Failure to return detectors is not a serious problem, accounting only for about 3% of measurement applicants.

## Above the action level

5.06 Following measurement, the main possible steps explored were (i) the seeking of further advice and (ii) the undertaking of both 'partial' and 'full' remedial measures.

## Seeking advice

5.07 Approximately one-fifth (19% in the interview survey, 22% in the postal survey) of households with measurements above the Action Level sought further advice. It was found (from the postal survey) that households with higher radon levels were more likely to seek advice. The average radon level of those who sought advice was 601 Bq/m<sup>3</sup> compared with 411 Bq/m<sup>3</sup> for those who did not seek advice.

5.08 Seventy per cent were satisfied with the advice they received and the degree of satisfaction is positively related to subsequent remediation.

## Sources of advice

5.09 Some respondents consulted more than one source of advice, so the categories in **table 2** are not mutually exclusive. The subsample for the interview survey is too small for further analysis, but in the postal survey, **table 2** shows that specialist radon firms, consulted by 33%, have the largest share of the 'market', followed by builders, who were approached by 24% and professional architects/surveyors by 12%. So far as local government is concerned, District Council Officials (25%) and Environmental Health Officers (16%) account for a substantial proportion of advice sought. Turning to central government, the Building Research Establishment and the central divisions of the Department of Environment contributed advice to 17% of those seeking advice, although these were not necessarily accurately distinguished by respondents.

Table 2 Sources of Advice

Sources of advice	Postal (N=292)
A builder	24% (70)
A specialist radon firm	33% (97)
A professional consultant (eg. architect, surveyor, etc)	12% (36)
The Building Research Establishment	11% (33)
Local council official	25% (73)
Citizens' Advice Bureau	2% (6)
Environmental Health Officer	16% (46)
Department of Environment	6% (18)
Other	5% (15)

## Acting on advice

5.10 Radon remedial measures include reducing pressure beneath a solid floor (a radon sump); ventilating suspended floors; installing pressurisation systems; sealing floors and unused chimneys and modifying ventilation (for example by opening downstairs windows). Sealing cracks and modifying ventilation do not represent wholly reliable or effective measures, and are considered only as 'partial remedies' in this analysis.

5.11 The percentages that have acted fully upon the advice or estimate are 14% (interview) and 28% (postal). The difference between the two surveys probably reflects the higher likelihood that 'remediators' would reply to the postal questionnaire.

5.12 Of all those above the Action Level, only a very small proportion (3% interview and 6% postal) have undertaken full remedial work. Over two-thirds (71% and 68% respectively) have taken no action at all. The remainder have taken various partial measures or DIY actions that are not considered effective. These are to increase ventilation, seal cracks in floors, seal unused chimneys and lay impermeable material to seal floors.

5.13 Approximately 3% of those above the Action Level have applied for a discretionary grant.



# Applying for measures

2.10	Local council official	2.10	Local council official
2.11	Office/Advice Bureau	2.11	Office/Advice Bureau
2.12	Department of Environment	2.12	Department of Environment
2.13	Other	2.13	Other
2.14	Other	2.14	Other
2.15	Other	2.15	Other
2.16	Other	2.16	Other
2.17	Other	2.17	Other
2.18	Other	2.18	Other
2.19	Other	2.19	Other
2.20	Other	2.20	Other
2.21	Other	2.21	Other
2.22	Other	2.22	Other
2.23	Other	2.23	Other
2.24	Other	2.24	Other
2.25	Other	2.25	Other
2.26	Other	2.26	Other
2.27	Other	2.27	Other
2.28	Other	2.28	Other
2.29	Other	2.29	Other
2.30	Other	2.30	Other
2.31	Other	2.31	Other
2.32	Other	2.32	Other
2.33	Other	2.33	Other
2.34	Other	2.34	Other
2.35	Other	2.35	Other
2.36	Other	2.36	Other
2.37	Other	2.37	Other
2.38	Other	2.38	Other
2.39	Other	2.39	Other
2.40	Other	2.40	Other
2.41	Other	2.41	Other
2.42	Other	2.42	Other
2.43	Other	2.43	Other
2.44	Other	2.44	Other
2.45	Other	2.45	Other
2.46	Other	2.46	Other
2.47	Other	2.47	Other
2.48	Other	2.48	Other
2.49	Other	2.49	Other
2.50	Other	2.50	Other
2.51	Other	2.51	Other
2.52	Other	2.52	Other
2.53	Other	2.53	Other
2.54	Other	2.54	Other
2.55	Other	2.55	Other
2.56	Other	2.56	Other
2.57	Other	2.57	Other
2.58	Other	2.58	Other
2.59	Other	2.59	Other
2.60	Other	2.60	Other
2.61	Other	2.61	Other
2.62	Other	2.62	Other
2.63	Other	2.63	Other
2.64	Other	2.64	Other
2.65	Other	2.65	Other
2.66	Other	2.66	Other
2.67	Other	2.67	Other
2.68	Other	2.68	Other
2.69	Other	2.69	Other
2.70	Other	2.70	Other
2.71	Other	2.71	Other
2.72	Other	2.72	Other
2.73	Other	2.73	Other
2.74	Other	2.74	Other
2.75	Other	2.75	Other
2.76	Other	2.76	Other
2.77	Other	2.77	Other
2.78	Other	2.78	Other
2.79	Other	2.79	Other
2.80	Other	2.80	Other
2.81	Other	2.81	Other
2.82	Other	2.82	Other
2.83	Other	2.83	Other
2.84	Other	2.84	Other
2.85	Other	2.85	Other
2.86	Other	2.86	Other
2.87	Other	2.87	Other
2.88	Other	2.88	Other
2.89	Other	2.89	Other
2.90	Other	2.90	Other
2.91	Other	2.91	Other
2.92	Other	2.92	Other
2.93	Other	2.93	Other
2.94	Other	2.94	Other
2.95	Other	2.95	Other
2.96	Other	2.96	Other
2.97	Other	2.97	Other
2.98	Other	2.98	Other
2.99	Other	2.99	Other
3.00	Other	3.00	Other

2.10 Local council official

2.11 Office/Advice Bureau

2.12 Department of Environment

2.13 Other

2.14 Other

2.15 Other

2.16 Other

2.17 Other

2.18 Other

## 6 Factors Influencing Remediation: Methodology

### Analysis of attitudinal factors

6.01 Given that the route to remediation is sequential, improvement in take up at any of the steps may be expected to have a useful effect on the final remediation rate. The factors influencing the decisions and actions by households at each step in the route to remediation were, therefore, explored in a number of ways. The results from the two main surveys have been combined here for ease of interpretation, but are described separately in the full technical report.

6.02 Firstly, householders were asked directly to give their reasons for not applying for measurement or for not undertaking remedial work if over the Action Level from a list of statements.

6.03 In addition, various analyses were carried out on both the postal and interview surveys to explore both socio-demographic factors and attitudinal factors that were associated or correlated with successive levels of remediation. The socio-demographic factors included age of the householder, employment status, social group, marital status and gender.

6.04 Attitudinal factors were gained from the postal survey through 14 attitudinal statements about the radon issue with which respondents were invited to agree or disagree (shown in **table 3**).

### Principal components analysis

6.05 A Principal Components Analysis was carried out on these attitudinal statements, in order to reduce them to a smaller number, grouping together those that could be shown from their inter-correlations to be measuring the same general attitude.

6.06 One of the 14 statements "I am/we are especially worried about children" had an unacceptable level of missing data and was therefore excluded from the analysis. Four interpretable factors were extracted. Each factor is independent of (or uncorrelated with) each of the other factors and is named to reflect its dominant items and the 'general thrust' of other items. The names chosen were:-

- (1) Health concern
- (2) Policy scepticism
- (3) Property pragmatism
- (4) Disbelief (about risk of radon)

Table 3 Factor Analysis of the Fourteen Attitude Statements

	Factor 1	Factor 2	Factor 3	Factor 4
1 The risk is not serious compared to others we have to face every day				.560
2 I am/we are not in favour of government "advising" people what they should do in their own home		.557		
3 Round here, people who spend money on preventing radon are seen as "fussy", oversensitive		.575		
4 It generally helps the value of the house property to make it "radon free"			.764	
5 The pressures of the housing market can be relied on to solve the problem of radon		.675		
6 Radiation leaks from the nuclear industry are more worrying than radon				.524
7 I/we are sceptical about the whole radon issue		.448	-.577	
8 It is right to take action - if it doesn't benefit us it will benefit others in the future			.641	
9 The government ought to give full grants to everyone whose home is above the recommended action level	.678			
10 I/we always try to put health before anything else	.684			
11 As a family, we tend to use the doctor more than most				-.633
12 I am/we are especially worried about the children				(item excluded from analysis)
13 We dread the thought of cancer from radon	.550			-.458
14 We should all do everything possible to conserve the environment	.691			

Items with low 'loadings' contribute less strongly to the validity of a factor; they are less 'pure'. Their effect also tends to duplicate that of other items. By convention, therefore, a cut-off point of .350 or .400 is generally adopted.



6.07 These four factors were then used in the analysis of the postal survey. In addition, brief descriptions of each of the four 'attitudes' were added to the subsequent household interview so that respondents could choose (from a show-card shown in **table 4**) the one that most closely accorded with their own view.

**Table 4 Household Interview Survey: Attitudinal Showcard**

*"Here are some statements that sum up four different ways in which people might look at radon. Can you tell me which one comes closest to your own views on the problem?"*

- (i) "We are really concerned about the health risk from radon; everything possible should be done to remove it."
- (ii) "We are not sure if there is a real risk from radon, but anyway it will sort itself out without our help."
- (iii) "We are not particularly concerned about the health risk from radon but people should certainly take action to preserve the value of their houses."
- (iv) "We are not concerned at all about radon; there are plenty of worse risks to worry about."

6.08 Finally, to determine if and how feelings had changed since the campaign began, attitudes were also measured by the level of concern expressed by householders, at two different times, namely:-

- (i) the time of the publicity

"What were your feelings about radon as a health risk in your own household at that time (ie March 1991)?"

- (ii) the time the survey was carried out

"What are your feelings about radon as a health risk in your own household at the present time?"

6.09 Responses were based on a range of levels from unconcerned to very worried. These are referred to in the text as 'feelings in March 1991' and 'feelings at the time of the survey'.





## 7 Factors Influencing Remediation: Results

7.01 The Interview survey revealed that those more likely to read the initial campaign leaflet are in higher social groups, married, living in a low radon area, older, have feelings about radon of 'concern' but not 'worry', and have discussed radon with neighbours and friends.

7.02 Similar evidence is available from the postal survey, although here the sub-sample relates to those who did not apply for measurement. In addition to age and feelings about radon at the time of the survey, (where the results confirm the interview survey), two variables unique to the postal survey are correlated with reading the leaflet. These are the date of the building and awareness of the cost of remediation. Work status (not significant in the interview survey) is also correlated, with retired people being more likely to read the leaflet.

### Reading the campaign leaflet

### Application for measurement

#### Stated reasons

7.03 Householders could give more than one reason for not applying for a radon measurement, and thus the percentages in **table 5** do not add to 100%. One of the main reasons given directly by householders is failure to recall receiving or failure to read the pamphlet. Over one-third of the postal survey and 19% of the interview survey said they had not read the pamphlet. Furthermore, 19% in the postal survey and 5% of the interview survey claimed that they had not realised measurement was free, and this may be due either to failure to read the leaflet or from misreading the leaflet.

7.04 Various forms of disbelief or denial are very important, incorporating a variety of statements i.e. "radon is not a serious risk in this house/in this area/anywhere". Almost one-quarter of the postal survey and one-third of the interview survey agreed with the statement that "radon is not a serious health risk in *this* house" despite not having had a measurement carried out. Some denial might be justified; householders naturally draw inferences from local geology and reports of other people's measurement results.

7.05 A negative influence from neighbours was claimed by 11% of the postal sample, who stated that they had not applied for a measurement since "...neighbours and other people round here are not concerned".

7.06 Considerations of cost accounted for a large proportion of the reasons given by householders in the postal survey; indeed, 22% had not applied because they felt they could not afford to remediate if the measurement was high, whilst this was stated by only 4% of the interview survey.



**Table 5 Reasons Given For Not Applying for a Free Measurement**

NB. More than one 'reason' could be given per respondent.

	Interview (N=587)		Postal (N=621)	
<b>Whether you are a tenant or owner:</b>				
I /we didn't read the pamphlet	19%	(109)	35%	(216)
Radon is not a serious health risk in this house	32%	(189)	23%	(141)
Radon is not a health risk in this area	20%	(117)	18%	(111)
Radon is not a serious health risk anywhere	16%	(93)	3%	(16)
I/we meant to apply but I was/we were too busy at the time	6%	(35)	13%	(83)
I/we shall be moving house before there is any real danger	0%	(2)	2%	(13)
I/we expect to move house soon, so not worth the trouble	1%	(7)	4%	(26)
The publicity implies there is plenty of time	0%	(1)	3%	(18)
If fate says I/we shall get cancer, I/we shall get it	5%	(29)	7%	(45)
I/we mislaid application form until it seemed too late	3%	(15)	8%	(51)
Neighbours and other people round here are not concerned	3%	(17)	11%	(70)
My/our local doctor does not regard radon as a serious risk	0%	(0)	1%	(4)
I/we didn't realise the measurement was free	5%	(27)	19%	(121)
I/we are willing to accept the risk	7%	(40)	10%	(61)
If the measurement was high, I/we couldn't afford to act	4%	(23)	22%	(140)
Other	12%	(73)	9%	(57)
<b>If you are a tenant</b>				
It is the landlord's responsibility, not mine/ours	7%	(40)	4%	(22)

**Correlations**

7.07 Both surveys found that householders who are elderly and/or retired were more likely to apply for a radon measurement. The interview survey also found that married householders, those with higher incomes, who come from A and B social groupings and live in lower average radon areas were more likely to apply. However, the correlations with age, marital status and radon level appear mainly to be due to a higher tendency by older householders, married people and those who live in low radon areas to read the leaflet.

7.08 In contrast, both surveys found that those least likely to apply were on low income, under 45 and working. The postal survey, however, found no direct association with income levels although measurees were more likely to be high income retired households, live in detached houses and to be homeowners. In addition, the postal survey found that there is a low but significant positive correlation with awareness of the cost of remediation; those who applied for measurement were more likely to be aware of the potential costs at the time of the campaign.

7.09 Both surveys also found that application was related in the expected direction to reported 'feelings about radon' in March 1991 and to the four different attitudes towards radon. Those who said they felt concerned about radon in March 1991 were more likely to apply for a measurement than those who did not feel worried. In the interview survey, of those professing the attitude of 'health concern', 35% applied for free measurement and the figure is only slightly lower for 'property pragmatism' (31%); 'policy sceptics' were less likely to apply (18%), followed by 'disbelievers' (9%). The postal survey found that of the four attitudes, all except 'health concern' were related to measurement take-up, although 'property pragmatism' was the strongest predictor.



7.10 Social influences are clearly important. Those who applied tended to have discussed the problem with their neighbours and also with friends and relations. This was more likely among social groups A and B, younger respondents and those in full time employment. It is not possible to deduce whether these social influences are cause or effect, but it was earlier noted that discussion with neighbours is given also as a reason for not applying for measurement, which gives some credence to the likelihood of a causal influence. The role of friends and neighbours was also highlighted in the focus group discussions, where it was suggested that one of the reasons very few people had applied for measurements was because their neighbours and friends often regarded the idea as "nonsense".

## Seeking help or advice

7.11 Applying for a free measurement is an essential first step towards remediation, so the consideration of all subsequent steps is restricted to the sample of measurees.

7.12 The next step for those with a measurement above the Action Level is to seek advice, but it should be emphasised that although this is a likely precondition for structural remedial work, it does not pre-empt the various DIY forms of remediation or the intention to take some action in the future.

7.13 In the interview survey, seeking advice only appears to be related to the variable "fear of being ripped off". This is greater among the advice-seekers, which suggests that it is a post-decisional phenomenon. However, the postal survey found that it is related to feelings about radon in March 1991 and more strongly to feelings at the time of the survey, although not to change in these feelings. The attitudes of 'property pragmatism' and 'disbelief' are related; 'property pragmatism' is associated with seeking advice whilst 'disbelief' is associated with not seeking advice.

7.14 The focus groups revealed that whilst some households with high radon levels were prepared to remediate, they had found difficulty in obtaining advice beyond that in the package provided. Some felt District Council staff required more information and training, and a directive to become involved in encouraging remediation. Considerable concern was also expressed in these discussion groups about obtaining reputable builders, with appropriate experience and training.

## Concern over property values

7.15 Respondents in the interview survey were asked whether they would wish to know their radon level before putting their house on the market. Of homeowners, only 33% said "Yes" ("definitely" or "probably"). Predictably, these were more likely to be 'property pragmatists'. Other relationships are with gender (women wish to know); and average radon level in locality (those in higher areas wish to know).



7.16 Economic and property issues were also prominent amongst the concerns of the focus groups, particularly the potential effect of a 'radon scare' on property values. The groups felt that radon posed awkward moral questions to those who looked upon their property as a potential investment. Should they divulge their radon measurement? Should they avoid knowing it as a way of not divulging it? This fear of loss of value might in some cases provide the incentive to reduce radon levels. In only one reported incident in the focus groups had a surveyor recommended a potential purchaser have a radon report carried out on a property. This was seen by residents as an unwelcome foretaste of things to come.

## Partial or DIY measures

7.17 Those undertaking partial or DIY measures short of full remediation is a small subsample of only 19 of the 73 households above the Action Level in the interview survey. Most of these have merely increased the extent to which they ventilate the house. The only variable correlated with DIY actions is work status; predictably, those in full employment (i.e. with less spare time) being less likely to act than others. DIY actions are probably seen as substitutes for full remedial measures and not as precursors.

7.18 The Postal survey found that taking remedial actions of any kind is related to feelings about radon in March 1991 and to feelings at the time of the survey. 'Property pragmatism' and 'disbelief' are also significant predictors.

## Undertaking full remedial measures

7.19 Failure to remediate after receiving a measurement above the Action Level invokes several explanations by householders. More than one reason could be given by householders, and thus the percentages shown in **table 6** do not total 100%. However, the 'high cost' was the main factor in both surveys. It is claimed by half the postal sample and 29% of the interview sample that they "could not afford to take any of the recommended actions". Thereafter, a number of reasons were common. Age seems to play an important role, since one-third of the postal survey stated that carrying out remedial work was "not important for people of my/our age". Whilst age, therefore, seems to be a positive factor in applying for measurement, it is seen by many to be a reason for not acting because of the temporal, probabilistic nature of radioactive harm. Paradoxically, the same reason of time can be a shelter for the young, given the way in which 'The Householders' Guide' (2nd ed) presents a leisurely timescale for action, negatively related to radon level. Indeed, 16% of the postal survey stated that, "the publicity implies there is plenty of time".

7.20 The suggested timescales for remediation and the associated degrees of urgency contained in 'The Householders' Guide' (2nd ed) also arose as a factor influencing remediation in the focus group discussions. For those with homes showing levels of radon just above the Action Level, the sense of urgency was quite clearly being neutralised.

7.21 In addition denial or disbelief was evident in householders' stated reasons for failure to remediate, despite measurements above the Action Level. Approximately one-fifth of the interview survey and 15% of the postal survey agreed either that "we are sure that the building is not affected by radon" or "radon is not a serious health risk, whatever the level".



7.22 The focus group discussions revealed that health issues were minimised due to a lay re-estimation of the risks, largely by making favourable comparisons between radon and other health threats. Scientific explanations were deemed intangible and most felt that more concrete proof was required to convince them of the threat. 'Mere' statistical theory, even when based on direct measurement, does not appear to be convincing. The most potent anecdotal evidence relating to the health issue are the many radon-breathing all-Cornish citizens who live to ripe old ages. Greater concern was expressed over more 'visible' local pollutants such as untreated sewage and contaminated water supplies, and even nuclear power.

**Table 6 Reasons Given by those Above Action Level for Not Taking Specific Actions**

	Interview (N=52)		Postal (N=907)	
<b>Whether you are a tenant or owner</b>				
I am/we are sure that the building is not affected by radon	6%	(3)	9%	(84)
Radon is not a serious health risk, whatever the level	15%	(8)	6%	(58)
I/we have been too busy to do anything	6%	(3)	13%	(115)
I/we cannot afford to take any of the recommended actions	29%	(15)	49%	(446)
I/we shall be moving house before there is any real danger	6%	(3)	11%	(99)
The publicity implies there is plenty of time	4%	(2)	16%	(142)
The 'actions' would not be effective	0%	(0)	5%	(46)
I/we applied but could not get a grant	0%	(0)	3%	(29)
I am/we are waiting until other work needs to be done, eg alterations or redecorating	0%	(0)	12%	(104)
I/we try to avoid disrupting our lives in this way	2%	(1)	6%	(54)
Disturbing or eventful family circumstances prevented action	0%	(0)	4%	(33)
Not important for people of my/our age	2%	(1)	33%	(297)
People round here don't think it necessary	2%	(1)	10%	(91)
Other	35%	(18)	5%	(46)
<b>If you are a tenant</b>				
I/we think it is the landlord's responsibility	0%	(0)	4%	(38)
Landlord considers no action is needed	0%	(0)	1%	(11)
landlord considers tenants should act	0%	(0)	0%	(2)
Landlord considered action is needed, but has not acted	0%	(0)	1%	(5)
Acted	0%	(0)	0%	(4)

7.23 The postal survey found that radon level, income and age are positively related to taking full remedial actions. However, the trend for age is reversed at 65 years and beyond. This comprises almost a third of the sample and is representative of the proportion of the South West population. Combining age with income and work status shows that those least likely to take action are on low income, aged over 45 but not retired. There is also a low but significant correlation with awareness of the cost of remediation.

7.24 The pattern of results for attitudinal predictors is very similar to that for seeking advice and taking DIY action. That is, both 'property pragmatism' and 'disbelief' are strong predictors in their respective directions; those who were concerned with property values were likely to seek advice and those who were unconvinced about radon were not.



7.25 Attitudes towards grants for radon remedial measures were explored in the focus group discussions. Whilst some were opposed to the concept of grants, feeling that grants were open to misuse or expressed doubt whether there was a real need for grants, this was not the consensus. Most felt that general government assistance should be available although there was a variety of suggestions as to how grants should be calculated, such as in proportion to household income, the cost of remediation, the radon level or the health risk.

## Future intention to remediate

7.26 Householders were asked about their future plans to remediate. The interview survey found that these were not influenced by uncertainty, as indicated by lack of confidence in measurement accuracy, perceived 'lack of helpfulness' in pamphlets or a fear of being "ripped off", but rather related to attitude – with those expressing 'health concern' the most likely to express future intention to remediate, followed by 'property pragmatism'. Two socio-demographic variables are predictive of future intention, i.e. younger people and those in full time employment express more resolve. (These trends are opposite to those shown for application for measurement).

7.27 The postal survey found that future intention to remediate is the most predictable criterion. It is related to radon level, income, type of house and not smoking. Combining age, income and work status shows that those least likely to express future intention to act are those retired and on low incomes.

7.28 Feelings about radon in March 1991 and at the time of the survey, together with the change in feelings are also predictors. All four of the attitudes are correlated with future intention to remediate and each has its characteristic timescale. In particular, 'property pragmatism' is more likely to be associated with short term remediation and 'disbelief' with short-term inaction, whereas 'health concern' and 'policy scepticism' are linked to longer term action or inaction.

## Combining the variables to achieve the best prediction

7.29 Many of the socio-demographic and attitudinal variables have been shown to correlate with levels of remediation. As a final stage, a Discriminant Function Analysis was carried out to assess the relative importance of these variables. The procedure aims to combine variables so that the single new variable or 'function' that is achieved gives the best prediction (highest correlation) of remediation.

7.30 Using the postal sample of 1335 measurees above the Action Level, the procedure aims to group respondents correctly into either remediators or non-remediators i.e. it attempts to discriminate the respondents who have taken remedial actions from all others. Using only socio-demographic variables, the procedure resulted in correct classifications in only approximately 57% of cases, not much higher than would occur by chance.

7.31 Using a combination of 22 variables including attitudes, 74% of cases are correctly classified into those who have undertaken remedial work and those who have not (see table 7). The relative size of the correlations gives an indication of the relative 'importance' of predictors, but they are also dependent on intercorrelations between them. The variables have been ranked in order of importance. The best overall predictors are attitudinal, i.e. the attitude of 'property

pragmatism', followed by feelings about radon at the time of the March 1991 campaign. Radon level and household income follow in importance, before the attitude of 'disbelief'. The attitude of 'health concern' is tenth in order of predictive value.

**Table 7 Discriminant Function Analysis : Ranked Discriminant Scores for 22 Variables**

Property pragmatism (3)	-.456
Feelings in 1991	.398
Radon level	.360
Income	.330
Disbelief (4)	.322
Perceived accuracy of measure	-.296
Read 'Householder's Guide'	-.283
Aware of costs	-.233
House type	-.231
Health concern (1)	.196
Feelings now	.184
Children at home	.136
Change in feelings 1991/92	-.130
'Householder's Guide' helpful	-.121
Read 'Radon'	-.112
Sex	-.107
Age	.106
Retired	-.052
'Radon' helpful	-.026
Own Home	-.026
Smoker	.010
Policy scepticism (2)	.009





## 8 Communication of Information about Radon

### Evaluation of the campaign leaflet

8.01 The most common description of the leaflet selected by both measurees and non-measurees was "helpful", followed by "easy to read" but in these cases and others, the gap between their respective valuations is considerable. Negative descriptions were hardly used by measurees, except for "worrying" which may be considered positive in this context and which was used more than by non-measurees. Between 10–15% of non-measurees assessed the pamphlet as "irrelevant" as having "too little information", being "boring", or "worrying".

### Recall and evaluation of the 'measuree' package

8.02 Measurees only were sent a further package of information consisting of three pamphlets. These were read by 70% of interview and 60% of postal respondents, but there is little difference in their perceived presentation; they are judged to have been "clearly presented" by about 97%.

8.03 They are judged "very helpful" or "helpful" by 80%–90%, again with little differentiation between pamphlets. However, those above the Action Level found the pamphlets (except for the Householders' Guide) less helpful than others. Those above the Action Level were also asked if the package answered all their questions and only 47% agreed that it did.

8.04 The focus group discussions revealed some concerns about the package of information sent to measurees, and particularly about the Householders' Guide (2nd ed). Although the Guide was perceived as reasonably clear, individuals were left feeling abandoned, feeling that they would have to set the wheels in motion themselves. Some found the technical methods confusing, and their difficulties were added to by the lack of a clearly differentiated 'best available technology'. Indeed, it is lack of a *certain* cure for radon contamination that generates some hostility to paying for remediation, as well as the actual costs involved.

8.05 Focus groups were asked for their opinion on how the public perceive the booklets in general. Two schools of thought emerged. Some thought the booklets would find themselves filed in the bin along with all the other 'junk' mail circulating. Others thought it would be hidden under the pillow because it was so alarming.

8.06 Both the focus groups and the two main surveys suggest, therefore, that there is less than complete satisfaction with available information on the part of those with higher measurements, but this does not mean that additional 'objective' detail would disarm criticism. An alternative explanation is that attitudes determine both the likelihood of remediation and the response to the pamphlets. A range of supporting evidence for this was found.

## The 'mass media'

8.07 Less than one-third of the measurees had learned anything about radon from the 'mass media' - i.e. (in order of importance) from television (61%); local press (27%); national press (23%); and radio (16%). However, the contrast with the total population is stark. Only 7% have learned anything from the media, 4% from television and 2% or less from other sources. Media coverage of the issue seems to be slight for the population as a whole.

8.08 The focus group discussions seemed to indicate that more media coverage would be welcome, especially television coverage. Indeed, the members of the focus groups were keen for much more factual information about radon, including 'how-to' guidance and, wherever possible, evidence that meets the lay standards of proof. The lack of coverage so far on radon was felt to be not because radon is not 'newsworthy', but because it is not as yet an issue with its victims.



## 9 Survey of Environmental Health Officers

9.01 The results of the **survey of Environmental Health Officers** indicates that some slight progress has been made in raising the general awareness of the radon problem at the local authority level. The present survey, made in December 1992, with all 16 local authorities in Cornwall and Devon, was compared with the responses to a similar survey undertaken by the Institution of Environmental Health Officers (IEHO) in April 1991 (see **table 8**).

9.02 Although policies on radon grants have been drafted by nearly half of the councils, and informal policies characterise most of the remainder, the EHO's by no means perceive the 'authorities' (the councils, the NRPB and the national government) as well co-ordinated and adequately prepared to deal with the radon problem.

9.03 Of the 7 councils with written policies, only 3 give discretionary grants. However, of the councils without a written policy, 4 allow discretionary grants for radon. The threshold for grants is set extremely low, availability is sparse and take-up insignificant. In 1992, 5 districts had approved a total of only 11 grants, two of these being associated with minor works.

9.04 Although telephone enquiries have apparently increased noticeably in most areas since the IEHO survey, and despite promotional literature that implies the availability of grants, most enquiries made to EHOs seem to be of an information-seeking, rather than a grant-seeking nature.



Table 8 Survey of Environmental Health Officers (1992) compared to IEHO Survey (1991)

Local Authority	Q1 Written policy on Radon grants?		Q2 Does policy permit Radon grants?		Q3 No. of enquiries		Q4 No. of resources tests		Q5 No. of 'nil' grants		Q6 No. of grants approved		Q7 Cost of Radon remedial work	
	1991	1992	1991	1992	1991	1992	1991	1992	1991	1992	1991	1992	1991	1992
Plymouth CC	No	Yes	-	No	0	3	0	-	0	-	0	-	-	-
Restormel BC	Yes	No	No	Yes	4	0	0	-	0	-	0	-	-	-
Penwith DC	Yes	No	No	No	10	2/3	0	2	0	-	0	0	-	-
Torbay BC	No	No	-	Yes	0	2	0	0	0	-	0	1*	-	-
West Devon BC	Yes	No	No	No	22	2	22*	-	22*	-	0	-	-	-
Kerrier DC	No	Yes	-	No	20	40-50	0	-	0	-	0	1*	-	-
Mid Devon DC	No	No	-	No	0	6	0	-	0	-	0	-	-	-
Teignbridge	Yes	Yes	Yes	Yes	15	5-10	10	5-10	10	All but 3	0	3	-	-
Torrige DC	No	No	-	Yes	0	1-2	0	1-2	0	1-2	0	0	-	-
Carrick DC	Yes	No	No	No	2	2-3	0	-	0	-	0	-	-	-
South Hams DC	Yes	Yes	Yes	Yes	4	25-30	0	25-30	0	22-27	0	3	-	-
Exeter CC	No	No	-	-	0	0	0	-	0	0	0	-	-	-
East Devon DC	No	No	-	Yes	0	1	0	1	0	1	0	0	-	-
North Devon DC	Yes	Yes	Yes	No	0	Less than 5	0	-	0	-	0	-	-	-
North Cornwall DC		Yes		No		0		-		-		-		-
Caradon DC		Yes		Yes		50 app.		50		50		3		-

\* Approved for radon remediation with minor works

## 10 Recommendations

10.00 The findings of the survey suggest the following recommendations:-

### Increasing measurement take-up

10.01 The initial campaign, led by the 'Radon in Houses' leaflet, needs to be reinforced with the aim of achieving a substantially higher take-up of measurements. A revised and personalised letter to 'The Occupier' should be devised. Its style should be serious and its tone 'official'. The letter should specifically address the four most likely radon attitudes, i.e. reinforcing 'health concern' and 'property pragmatism' and rebutting 'policy scepticism' and 'disbelief'.

10.02 The design of the letter/leaflet should be piloted on appropriate samples, first by 'formative evaluation' and then by experimental comparison of three alternative versions. Each should be sent as a 'follow-up' to non measurees in different post code sub-areas where 'Radon in Houses' has previously been distributed.

10.03 In view of the proportion of householders who claim not to have realised the measurement is *free* – this point should be emphasised more strongly in the leaflet and in press and other publicity.

### Increasing knowledge about radon

10.04 Given that social pressure is likely to be effective and the present covert treatment of the subject (due to fear of property devaluation) is counter-productive – six methods are suggested for making the issue more salient in the public domain:-

- (i) The use of a 'cascaded' form of distribution for supplementary communications. This would improve targeting, increase positive peer pressure and bring the debate more into the open. It could be done *either* by sending packs to individuals, including further packs for onward distribution to neighbours and friends *or* by sending suitable information packs to local organisations for redistribution to members, discussion by committee etc. Care would be needed to ensure that the measurement process remains personal and confidential.
- (ii) The promotion of a 'speakers' panel', formed of EHO's and other similarly qualified experts who would address meetings in the Affected Areas, some especially convened in village halls etc, others as part of programmes of citizen groups – e.g. Women's Institutes, Residents' Associations etc.
- (iii) Information packs made available to teachers in schools to encourage debate in liberal studies, current affairs or other classes and to encourage the launching of 'projects'.



- (iv) To facilitate (ii) and (iii), it would be desirable to make one or more 20-minute videos that could be used as introductory or 'back-up' material for speakers or disseminated more widely for group use, loan schemes, or even individual purchase.
- (v) The provision of appropriate material is needed to actively encourage the local television and press to reinforce the message. This would require the preparation of short video and radio 'clips', 'soundbites' etc.
- (vi) The supply of badges and/or car stickers with each completed measurement, bearing messages such as  
"WE KNOW OUR RADON";  
"BE RADON AWARE";  
"IT'S BEST TO KNOW";  
"WE ARE RADON WELL", etc.

10.05 In order to sharpen the persuasiveness of messages about health concern, urgent attention should be given to the incorporation in the leaflet material of research results, as they become available, that show a more *direct* link between lung cancer and radon levels in the home.

10.06 The role of EHO's and District Councils, already important, should be strengthened. These are well established and independent sources of information and advice, to which the public appears to turn fairly readily. The centralised and specialist role of NRPB remains indispensable, but this would be best preserved if complemented by a stronger 'promotional' role for local authorities (See 10.04(ii) to (iv) above).

### **Increasing remedial action publicity**

10.07 In view of the disappointingly low proportion of households that undertake remedial action, further attention should be paid to the package of information sent with the radon measurement. At present, this is wholly informational, mainly concerned with the origins of radon and with methods of remediation. A more persuasive stance is recommended, targeting the four main attitudes shown by the research. This would be done by identifying and describing each one and then providing specific supporting evidence for 'health concern' and 'property pragmatism' and rebuttals for 'policy scepticism' and 'disbelief'. A shortened, summary version of the Householder's Guide, with source references to more detailed information, should be provided for those considering remediation.

10.08 Advice given to measurees that links radon level inversely to a recommended time-scale for remediation appears to reinforce the natural inertia. It should be replaced by universal advice to take action as soon as possible on the grounds (a) that the risk to health is unacceptable, and (b) future protection against loss of property values will depend on an NRPB measurement that is specifically *below* the government Action Level and not one that is merely "low".

10.09 Consideration should be given to the provision of an additional persuasive communication, to those above the Action Level only, at the time when measurement *results* are sent. This should be repeated at suitable intervals.

## Costs of remediation

10.10 Existing arrangements for grants are discretionary, means tested and have generated few enquiries and only 11 completions from 12,000 households above the Action Level. Given that for households generally, cost is a major deterrent to action, the Government should consider a contribution to the costs of the works to all households above the Action Level in addition to that now available to households on low incomes.

10.11 A system for registering approved contractors would remove the present deterrent arising from fear of 'cowboys'. If a general grant scheme were to be introduced, this supporting measure would be unavoidable. It would also offer the possibility that contractors would have to submit outline plans as part of the householder's application for grant. The evidence is that there is growing expertise and a steady increase in the number of reliable contractors, so what may earlier have been impractical can now be considered. Closer liaison with the private sector should be actively pursued.

10.12 As already mentioned, cost appears to be a serious deterrent, but householders' estimates of likely costs are diverse, many exceeding what is likely to be incurred. The provision of more detailed guidance on costs is recommended, perhaps by indicating ranges for different solutions, and mentioning some of the factors that might increase or decrease costs from the average level for each. The aim should be to reduce uncertainty. The availability of more experience is making this more feasible. However, consideration should be given to some system for gathering feedback on how many remediations, of what kind, at what cost and to what effect have been made. This could take the form of a questionnaire that would also serve the purpose listed as (10.09) above. NRPB would be well placed to fulfill this function without breaching confidentiality.

## Property market

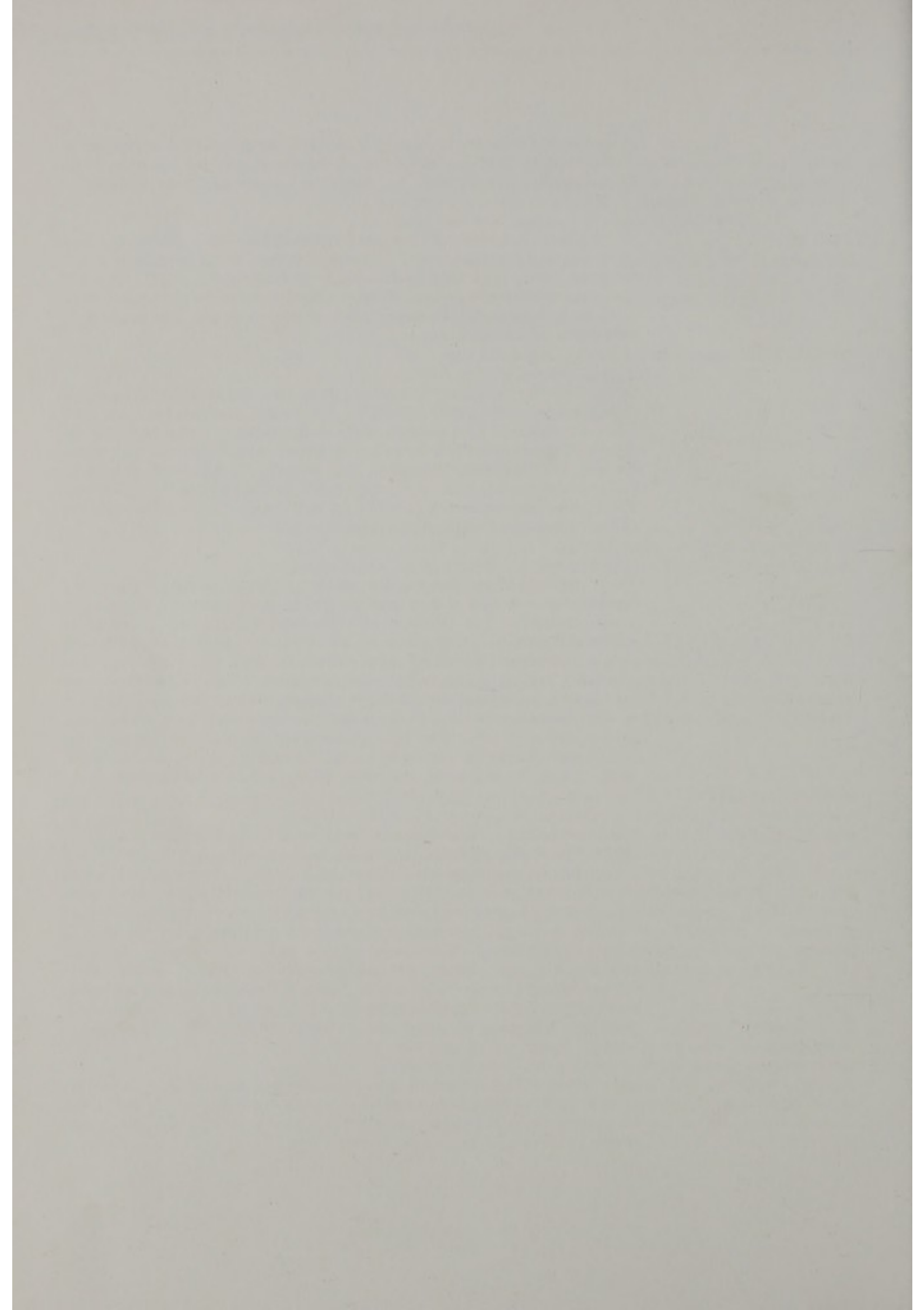
10.13 In view of the critical importance of 'property pragmatism' as a motivator of remedial action, and given that the property market would appear to offer the only sure (if long term) alternative to a universal grant system, there should be further research into the processes and policies of the main actors in the property market. An already envisaged survey of estate agents and valuers should be widened and extended to include surveyors, solicitors, Building Societies and Banks. In addition, a sizeable sample of recent house vendors and purchasers should be approached to ascertain the extent to which radon measurement had featured in the transaction. Building Societies should be questioned on the likely availability of mortgage extensions specifically designed to spread the cost of remediation for those (e.g. with young families) whose income is not low but fully committed.

10.14 Elderly people, because they remediate less than average, should be specially targeted with the messages that protection of their property value could be important to their future plans (which may require them to sell) and to their 'estate' i.e. for a surviving spouse or other heirs.



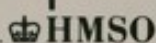












HMSO publications are available from:

**HMSO Publications Centre**

(Mail, fax and telephone orders only)

PO Box 276, London, SW8 5DT

Telephone orders 071-873 9090

General enquiries 071-873 0011

(queuing system in operation for both numbers)

Fax orders 071-873 8200

**HMSO Bookshops**

49 High Holborn, London, WC1V 6HB

(counter service only)

071-873 0011 Fax 071-873 8200

258 Broad Street, Birmingham, B1 2HE

021-643 3740 Fax 021-643 6510

33 Wine Street, Bristol, BS1 2BQ

0272 264306 Fax 0272 294515

9-21 Princess Street, Manchester, M60 8AS

061-834 7201 Fax 061-833 0634

16 Arthur Street, Belfast, BT1 4GD

0232 238451 Fax 0232 235401

71 Lothian Road, Edinburgh, EH3 9AZ

031-228 4181 Fax 031-229 2734

**HMSO's Accredited Agents**

(see Yellow Pages)

*and through good booksellers*

**£10 net**

ISBN 0-11-752901-X



9 780117 529014