



# Ministry of Defence

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Dear [REDACTED]

You requested information from The National Archive (TNA) in 2019. This request was directed to the Ministry of Defence (MOD) due to a review we are undertaking of some records held by TNA. You requested for the following information:

*I am seeking a copy of an article published in the Radiological Protection Bulletin issue 165 dated 1995 by G M Kendall on pages 16 & 17 entitled "Limiting radon exposure in caves and abandoned mines" which forms part of this record.*

As confirmed previously, we have treated your correspondence as a request for information under the Freedom of Information Act 2000 and we can advise that the Ministry of Defence (MOD) holds information in scope of your request.

We attach the article you requested: *Limiting radon exposure in caves and abandoned mines*.

We apologise for the significant delay in responding to your request and regret any inconvenience caused.

If you wish to complain about the handling of your request, or the content of this response, you can request an independent internal review by contacting the Information Rights Compliance team, Ground Floor, MOD Main Building, Whitehall, SW1A 2HB (e-mail CIO-FOI-IR@mod.gov.uk ). Please note that any request for an internal review should be made within 40 working days of the date of this response.

If you remain dissatisfied following an internal review, you may raise your complaint directly to the Information Commissioner under the provisions of Section 50 of the Act. Please note that the Information Commissioner will not normally investigate your case until the MOD internal review process has been completed. The Information Commissioner can be contacted at: Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF. Further details of the role and powers of the Information Commissioner can be found on the Commissioner's website at <https://ico.org.uk/>.

Yours sincerely,

Defence Nuclear Organisation Secretariat

# Limiting radon exposure in caves and abandoned mines

GERALD KENDALL · NATIONAL RADIOLOGICAL PROTECTION BOARD · CHILTON

**The National Radiological Protection Board considers that there is a need for advice on the limitation of exposures to radon, and its decay products, during recreational visits to caves, abandoned mines and similar places.**

The numbered points in this article constitute the essential elements of the proposed advice. Comments on the proposals are invited. They should be sent to the author at the Board to reach him no later than the end of June 1995.

Both the content and format of the advice may change as a result of this consultation exercise. The Board would also welcome suggestions on how this advice might most effectively be promulgated.

- (1) Radon is a natural radioactive gas given off by most materials in the earth's crust. Amounts can build up in enclosed spaces such as caves, mines and buildings. Under certain circumstances exposure to radon, or more strictly its short-lived decay products, can lead to excessive doses to the lungs of people. Elevated levels of lung cancer have been observed in miners and also in those exposed to high domestic levels of radon.
- (2) Occupational exposures to radon, including those incurred underground, are controlled under the Ionising Radiation Regulations 1985<sup>1</sup>. The Board has also issued advice<sup>2-6</sup> on the limitation of domestic exposures.
- (3) Hitherto there has been no guidance on the limitation of exposures to radon during

recreational visits to caves, abandoned mines and similar places. The Board now feels that it is appropriate to make such a recommendation. This advice is aimed mainly at individuals, trained and equipped for the activity, who are likely to penetrate beyond the outer parts of such places.

- (4) The Board recommends an annual limit of  $10^6 \text{ Bq m}^{-3} \text{ h}$  (1 million  $\text{Bq m}^{-3} \text{ h}$ ) for exposure to radon gas.
- (5) The exposure limit is broadly similar to the exposure from living for a year in a house just below the Government Action Level. Under most circumstances it is equivalent to a limit of roughly 1 Working Level Month (1 WLM). The Board believes that this limit is appropriate and that it will not unduly affect the activities of most of those who visit caves, abandoned mines etc.
- (6) The exposure limit is appropriate for an equilibrium factor of approximately 0.4. In circumstances, where equilibrium factors are known to be consistently higher or lower, a modified limit may be appropriate.
- (7) The exposure limit is advisory and has no regulatory or similar significance.
- (8) The Board advises that measurements should be undertaken to ensure that this limit is not exceeded. In some caves or abandoned mines radon levels may be well established. In most circumstances, however, personal monitoring will be required.
- (9) Track etch detectors are a simple, cheap and robust means of monitoring. In most circumstances a track etch detector worn for a period of 3 months will be adequate.

If radon levels are known to be generally low and predictable this period can be extended to 6 months. If many visits are to be made in a short period or radon levels are high or unpredictable a shorter wearing period may be appropriate. Alternatively, shorter term measurements may be made with electrets or electronic equipment.

- (10) The recommended exposure limit is designed to protect against the possibility of long-term development of lung cancer. The Board wishes to stress that the development of lung cancer is not inevitable and that early effects are not likely to be a matter of concern.
- (11) Nevertheless, radon exposures do carry a risk and the Board advises that leaders of parties going underground should explain these risks to those they lead and that, as well as keeping within the recommended limit, exposures should be minimised to the extent that this can be done without unduly constraining the recreation.
- (12) Organisations involved in this consultation exercise will be asked to help promulgate this advice to their members.

#### REFERENCES

- 1 The Ionising Radiations Regulations 1985. London, HMSO, SI (1985) 1333.
- 2 NRPB. Limitation of human exposure to radon in homes. *Doc. NRPB 1*, No. 1, 15-16 (1990).
- 3 NRPB. Radon affected areas: Cornwall and Devon. *Doc. NRPB 1*, No. 4, 37-43 (1990).
- 4 NRPB. Radon affected areas: Derbyshire, Northamptonshire and Somerset. *Doc. NRPB 3*, No. 4, 19-28 (1992).
- 5 NRPB. Radon affected areas: Scotland. *Doc. NRPB 4*, No. 6, 1-8 (1993).
- 6 NRPB. Radon affected areas: Northern Ireland. *Doc. NRPB 4*, No. 6, 9-15 (1993).

# VAM programme 14

MICHAEL YOUNGMAN · NATIONAL RADIOLOGICAL PROTECTION BOARD · CHILTON

**Since 1988 the Department of Trade and Industry (DTI) has supported a Valid Analytical Measurement (VAM) initiative. VAM programme 14 is concerned with sampling and measurement of aerosols and particulates in the gas phase. The programme of work is summarised here.**

Aerosol measurement is important in radiological protection because airborne particles provide such an effective mechanism for the transport of radionuclides through the environment and into the body. The behaviour of airborne particles depends on their size and this affects deposition in the respiratory tract and the collection efficiency of air samplers. A government initiative to strengthen quality control in aerosol measurement is therefore greatly welcomed.

A Government White Paper *Measuring up to the Competition* highlighted the importance of accurate measurement and led DTI to begin the VAM series of initiatives. A consortium of AEA Technology, Warren Spring Laboratory and the National Physical Laboratory was awarded the contract to set up a national infrastructure for aerosol measurements in the gas phase. The work was divided into three areas:

- provision of certified reference materials,
- development of sampling guidelines,
- founding of the National Calibration Forum for Aerosol Analysis.

Articles

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