

1996 International Congress on  
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FORM FOR SUBMISSION OF ABSTRACTS  
(Instructions for preparation on reverse)

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PAPER TITLE CALIBRATION AND QUALITY ASSURANCE FOR THE MEASUREMENT OF  
RADON

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MAJOR SCIENTIFIC TOPIC NUMBER 1.1. (see page 7)

ABSTRACT (See instructions overleaf)

**CALIBRATION AND QUALITY ASSURANCE FOR THE  
MEASUREMENT OF RADON**

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In many countries measurement of 222-Rn in air is performed as a part of governmental radiation protection activities. In such screening programs, there is need for exact national primary standards. Additionally reliable secondary references should be available as regular quality assurance for radon measurement services. The author reports on his experiments in

- ☐ qualifying a new type of radon monitor, to be used as a reference machine for the calibration of other active and passive radon measurement systems
- ☐ cross-checking a set of five monitors in 15 different radon calibration facilities around the globe (International Calibration Experiment ICE'94)
- ☐ qualifying the instrument under US-EPA's RMP program and for the Federal Russian GOSSTANDARD as radon reference equipment
- ☐ establishing a "quick" field calibration procedure for routine QA, based on the NIST radon standard SRM 4968 and a portable calibration chamber

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### PAPER TITLE

Radon measurements in the environment

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### ABSTRACT (See instructions overleaf)

Radon is a natural radioactive gas. It is a chemically inert, highly radioactive daughter of uranium, thorium and actinium decay. A part of the radon formed in earth's crust (natural source) and in radioactive wastes storage sites (artificial source) can migrate to the atmosphere through cracks, fissures by transport mechanisms (diffusion, fluid convection). Thus, radon occurs naturally in every place and not in uranium mines only. It may pose a health risk for the population, because it is the first component of the average annual radiation exposure to the population.

For the past 10 years, we have been developing complementary techniques in the detection of radon and its decay products (proportional counter, silicon detector and solid state nuclear track detectors). A methodology has been developed to analyze the radon concentration in large and varied areas in using. This analysis is effected in time or in space. Thus, the measurements reveal the distribution of radon emanation and the range of variation. The method is used routinely for the following purposes: in homes in the aim of radioprotection, in geological applications for prospecting, studying the movement of the earth crust and analyzing the effect of alpha pollution in the environment.

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PAPER TITLE Ventilation Model for Elevated Radon Decay Product Levels Indoors

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### ABSTRACT (See instructions overleaf)

Indoor concentrations of short-lived radon decay products (Rn-d) can reach levels over 1000 times that of outdoor levels and such elevated levels pose a significant risk of fatal lung cancer. High Rn-d levels indoors are generally dominated by ingress of soil gas of high Rn concentration and by ventilation characterized by poor outdoor air exchange - building materials and water making only minor contributions (with recognizable exceptions).

When considering the buildup of Rn and Rn-d in a building the source is Ra-226 in a soil-gas compartment which is successively (serially) connected to compartments of the building. There are losses from each compartment to the outdoor air which acts as a sink and to surfaces which act as sinks for the Rn-d; in the soil-gas compartment surfaces remove the Rn-d quantitatively.

The ventilation fluctuates and can coarsely be categorized into 'stagnant' situations and into wind activated situations. Modelling these situations, and changeovers thereof, provides an insight into the relative importance of the various parameters, such as the effect of the (?poorly known) soil-gas compartment.

Stagnant situations generally provide the higher concentrations whereas changeover situations can produce peak concentrations of short duration. Accurate short-term measurement of the activity ratios of Rn and individual Rn-d can indicate what ventilation situation prevails.

Applications of modelling are the more accurate prediction of longterm exposures from short term measurements, ventilation analysis and assessment of the potential for remedial action.