

# THE SIGNIFICANCE OF RADIOACTIVE AEROSOL MEASUREMENTS MADE IN THE WORKING ENVIRONMENT

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**Abstract**—The objectives of radioactive aerosol measurements in the working environment are reviewed; it is emphasized that a clear distinction must be maintained between (i) sampling to determine personal exposure—both chronic and acute intakes; (ii) sampling to determine general contamination levels in the working environment; and (iii) early warning sampling using alarm devices to detect important increases in the level of air contamination in the working area.

The suitability of personal air samplers for the measurement of personal exposure is discussed, in particular the relevance of short term or even individual exposure measurements. In many areas upper limits to average personal exposure can be estimated satisfactorily from continuously operated static samplers. In such cases it is necessary to make assumptions about the relationship between the long-term average air contamination as measured by such static samplers and average personal exposure as measured by personal air samplers.

Published mean values of the ratio of results obtained with personal air samplers and static air samplers are reviewed and shown to vary widely depending on the nature of the aerosol and the working environment, and the relative positions of the instruments. It is concluded that in the absence of evidence to the contrary, a factor of 0.1 should be applied to the ICRP maximum permissible concentrations to convert them to criteria against which the long-term average of the results from static air samplers may be used to demonstrate compliance.

Measurements of the particle size distributions of aerosols encountered in establishments of the Atomic Energy Authority are discussed and the application of this data to allow modified values of ICRP maximum permissible concentrations to be employed. These modified values involve a factor derived from the difference between the lung retention of the fraction of the sample assumed to be respirable and that of the ICRP Standard Lung Model. The further modifications to the current ICRP values of (m.p.c.)<sub>a</sub> permitted by the lung model proposed by the ICRP Task Group on Lung Dynamics are briefly considered in relation to the particular aerosols discussed.