IRPA9
1996 International Congress on Radiation Protection
April 14-19,1996
Vienna, Austria

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PAPER TITLE THE THEORY OF RELIABILITY AS A BASIS FOR RISK ESTIMATES OF THE HEALTH EFFECTS ASSOCIATED WITH RADON AND ITS PROGENY

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MAJOR SCIENTIFIC TOPIC NUMBER 1.1.. (see page 7)

ABSTRACT

The contribution of radon and its short-lived decay products amounts to as much as 80% of the indoor background radiation in Russia and other republics of the FSU. No less than 10% of the lung-cancer risk in human populations may be ascribed to the radon radiation. The lung-cancer annual mortality-rate risk for adults follows the double exponential distribution function. To explain this law, the reliability-theory approach has been developed [Grodzinsky et al., 1987; Koltover, 1995]. This approach enables explanation of the kinetics of the mortality growth with age together with evaluation of effects of exposure to radon progeny. Apart from the quantitative constructing of mortality curves, the theory of reliability may also serve as the basis of investigation of molecular mechanisms of radon effects. In part, the hormetic effects of low-dose exposure to radon can be explained as resulting from its mild stress-action upon the neuro-endocrine system that trains the organism's adaptive possibilities. The analysis of fluctuations of physiological parameters is suggested as the prognostic method for testing the reliability of bio-systems while exposed to radon and its decay products.