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### Occupation health at drinking water treatment plant using ground water with elevated concentrations of radon <sup>222</sup>, radium <sup>226</sup> and radium <sup>228</sup>

The content of radionuclides in ground water, as raw water for drinking water treatment, can vary in a wide range. In the case of high content of the natural radionuclides, especially content of radium 226 and radium 228, the most often used process of their removing is aeration followed by the filtration on gravity or pressure filters filled with sand covered with iron and manganese oxides, eventually with other medium as Birm or Greensand. These procedures had been used for the water treatment before the radioactive substances content in water and their ingestion risk were known. During the water treatment process, the radioisotopes of radium 226 and radium 228 are retained in the filter media together with iron and manganese. Retained radium 226 generates its daughter radionuclide - gaseous radon 222. During the filters washing, radon 222 is released into the air of the water treatment plant hall. This will be shown on an example, when the radon 222 concentration in raw ground water is low but it gets into the treated water during the treatment process. When the filters are being washed, the radon 222 concentration in the air of the plant significantly increases. The dependence of radon concentration in the air on the radium 226 activity in the sand of the particular filters was assessed. The inhalation dose rates due to radon 222 and dose rates from filter media for the operating personnel were evaluated.

#### Biography

Eduard Hanslík has completed his studies at Department of Water Technology and Environment at the University of Chemistry and Technology in Prague in 1969 and successfully concluded his Post-graduate research in 1981 at the same university. He completed the UNESCO Hydrological Course at Lomonosov University in Moscow. He focused on behavior of radioactive substances in the aquatic environment and possibilities of removal of radioactive substances, including radon-222 gas, during water treatment. He is an expert guarantor of national conferences e.g., radionuclides and ionizing radiation in water management (1978–2016).

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