

INDOOR RADON GAS (^{222}Rn) IN A PUBLIC WORKPLACE IN ALDAMA, CHIHUAHUA, MEXICO

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Abstract. Inhalation of radon gas (^{222}Rn) induces lung cancer in human. The municipality of Aldama in Chihuahua, Mexico, possesses high levels of natural uranium and; therefore, it was hypothesized that high radon concentrations are present in the environment due to the fact that this gas is a byproduct of the uranium decay. The objective of this study was to quantify the ^{222}Rn levels in a public office and to determine the potential negative impact of exposure to workers. The study was conducted in two steps; in the first step (FS) it was determined the ^{222}Rn concentration with a portable AlphaGuard device (Professional Radon Monitor, Genicon Instruments GmbH), at three high levels (0.74 m, 1.33 m and 2.06 m) in a public office during 3 complete days for each height. The device was positioned in the corner of the office more distant of the main door. In addition of quantifying ^{222}Rn in Becquerels (Bq m^{-3}), with readings every 10 min, ambient temperature (AT), air pressure (AP) and relative humidity (RH) were also measured every 10 min. The second step (SS) was similar to the first one, but the device was placed in the center of the office. An analysis of variance (ANOVA) was performed for each step ($\alpha=0.05$), considering a factorial arrangement design 3x2; where the Factor A was the elevation with three levels (0.74 m, 1.33 m and 2.06 m) while Factor B was the time with two levels; during the day (9:00 to 21:00 h) during the night (21:00 to 9:00 h). The results showed that statistical differences were noted for height ($P<0.05$), for time ($P<0.05$) but not for the interaction ($P>0.05$). The ^{222}Rn concentration was higher at 0.74 m with about 161.34 Bq m^{-3} en FS and 167.05 Bq m^{-3} in SS. These concentrations are higher than maximum recommended for the international agencies with stipulate a concentration of 157 Bq m^{-3} ; however, during the day the ^{222}Rn values were lower. It is concluded that the ^{222}Rn values during the day are not greater than the recommended concentration of international agencies; therefore, the workers are safe in their workplace.

Key Words: heavy gas, miner disease, uranium byproducts, Chihuahua Mexico

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