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The Determination of Radon Exhalation Rate from Water using Active and Passive Techniques

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ABSTRACT

The present article represents two sets of experimental works in the measurements of Radon concentrations in surface, underground water and oil-produced water separated from oil in Basra Governorate in Iraq. The first measurement in by using fast electronic techniques called RAD7 and the second is the passive method by using the solid state nuclear track detectors CR39 and L115-II. Tap water in the governorate, has a very low radon concentration 174Bq/m^3 at Al-Fao port, private wells water did show a radon level as high as 2050Bq/m^3 at Lehais south, while the oil- production waters have radon level ranging between 8464Bq/m^3 and 50926Bq/m^3 .A conclusion has been made, that Basra governorate tap water is safe as far as radon concentration, while oil-production waters should be avoided. Samples of water were collected during March 2011, from all locations in the governorate .From each location three samples were collected at different day time.

Keywords: Radon, RAD7, SSNTD, Drinking water, Underground water, Oil- Production water.

INTRODUCTION

The main concern of environmental monitoring is the measurement of the natural radiation arising from naturally radioactive materials and their progenies. Researches carried out in recent decades show that; under normal conditions, more than 70% of a total annual radioactive dose received by people originates from natural sources of ionizing radiation, whereby 54% is due to the inhalation and the ingestion of natural radioactive gas radon ^{222}Rn and its decay products. Exposure to radon via inhalation in closed rooms is the cause of about 10% of all deaths from lung cancer [1, 2]. Radon is a natural inert radioactive tasteless and odorless gas, whose density is 7.5 times higher than that of air. It dissolves in water and can readily diffuse with gases and water vapor, thus building up significant concentrations. Radon (^{222}Rn), which is one of the daughters of uranium (^{238}U), represents the most important radon isotope, with physical half-life