

## **ASSESSMENT OF RADON CONCENTRATION IN THE WATER SOURCES OF TOWN 1 PESHAWAR AND ITS EFFECTS ON ENVIRONMENT**

**Muhammad Tahir; Nimat Ullah Khattak; and Shah Faisal**

*NCE in Geology, University of Peshawar*

mtahirgeo7@gmail.com

### **Abstract**

To determine the health risks associated with radon concentration in drinking water, samples from three different Union Councils (UC) were studied. In Peshawar Town-1 area 63 fresh water samples were collected in order to determine their radon concentration using RAD7 electronic apparatus. Among these sample 11 were collected directly from tube wells, 41 from tap water of tube wells, and 11 from bore holes. All these water samples were used for drinking purposes have a maximum, minimum and mean radon concentration value of  $51.6 \pm 2.9$ ,  $6.7 \pm 1.1$  and  $29.0 \pm 1.3$ , Bql<sup>-1</sup> respectively. In average, 96% of the water samples used for drinking purpose showed higher radon concentration than the maximum contaminant level of 11.1 Bql<sup>-1</sup> as per Environment Protection Agency standards. Mean annual effective doses received to stomach (ingestion), lung (inhalation) and ingestion plus inhalation (whole body) from drinking water sources in Peshawar Town-1 were computed to be  $0.0062 \pm 0.00033$ ,  $0.0732 \pm 0.034$  and  $0.080 \pm 0.0037$  mSv, respectively. From UC Faeerabad 22 water samples were studied which bear maximum, minimum and mean concentration values of  $40.6 \pm 2.9$ ,  $6.7 \pm 1.1$  and  $21.2 \pm 1.8$ , Bql<sup>-1</sup>, respectively. Mean ingestion, inhalation and whole-body effective doses from drinking water sources in Faeerabad were computed to be  $0.00445 \pm 0.00039$ ,  $0.5358 \pm 0.0130$  and  $0.5804 \pm 0.0050$  mSv per annum, respectively. Similarly, 20 samples were collected from UC Shahi Bagh and showed radon concentrations of,  $51.6 \pm 2.9$ ,  $12.7 \pm 1.7$  and  $33.5 \pm 2.5$  Bql<sup>-1</sup> as their maximum, minimum and mean values, respectively. In Shahi Bagh mean effective doses i.e. ingestion, inhalation and whole body from water sources were computed as  $0.007402 \pm 0.00073$ ,  $0.08451 \pm 0.0082$  and  $0.09155 \pm 0.00883$  mSv per annum, respectively. Furthermore, 21 samples were collected from UC Sikandar Town with maximum, minimum and mean radon concentrations of  $41.7 \pm 2.7$ ,  $23.2 \pm 1.7$ , and  $32.9 \pm 1.3$  Bql<sup>-1</sup>, respectively. In this town the mean ingestion, inhalation and whole body doses were computed to be  $0.00692 \pm 0.00028$ ,  $0.8299 \pm 0.0034$  and  $0.090 \pm 0.0035$  mSv per annum, respectively. The increasing trend of the radon concentration is observed to be from south to north and it is supposed that higher concentration of radon in the study area is due to the deposition of the thick sediments in the Peshawar basin.