

LUMEN 2014

Social Security and Public Health: is Radiation a Threat or a Benefit?

Renat Apkin^{a,*}

^a*Department of Engineering ecology and rational nature management,
Kazan State Power Engineering University, Krasnoselskaya str., 51, Kazan, 420066, Russia*

Abstract

Among all the factors that determine social security and public health there is the most important one to investigate: i.e., radiation. This paper is about real danger and probable usefulness of radiation, to consider both and to prove that all possible attention must be paid to it. Since the discovery of the natural radioactivity, people's attitude towards radiation is constantly changing. Originally it was believed that radiation produced solely detrimental effect on the organisms. But recently, the scholars working in radiobiology reported about the beneficial, protective effect of low doses of the total radiative forcing. Not long ago it was found out that the most important for human health was a natural resource of radiation, namely, the gas called radon (Rn), the α -emitter, with the products of its divisions. Calculations carried out in different countries have shown that exposure to radon forms nearly half of the dose received by a person from all sources of radiation. Theoretically, the problem is to figure out whether radon is dangerous or safe, because the observations data are contradictory and the experiments have not been conducted, as far as we know. In practice, if it is confirmed that there exists of a "safe threshold" dose, below which the exposure to radon might even be regarded as useful, then the task will be to establish this threshold and to apply radon in order to increase the protective properties of living organisms.

© 2014 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

Selection and peer-review under responsibility of the Organizing Committee of LUMEN 2014.

Keywords: social security, public health, radiation, radon, threat, benefit

* Corresponding author. Tel.: +7-937-286-9710
E-mail address: renat.apkin@gmail.com

Introduction

In the environment, there are many different factors having permanent effect on the living organisms, including human. Among them radiation is of special interest, which happens to be the exhalation, or emanation, of energy in the form of particles or waves. Unlike other environmental factors, ionizing radiation cannot be detected by living organisms. Its effects are represented as the so-called spontaneous mutations and the development of malignant tumors, malformations. Radiation is invisible, but visible are its consequences; the danger to human beings lies within the large amount (dose) and specific character of radiation (Rozenberg & Krasnoshekov, 2007, p. 132).

Natural radiation accompanies us throughout our lives as it has always existed on earth: before the birth of humankind, and even before life itself, it was present here and it also was present in the space before the Earth itself was born. Radioactive elements included in the composition of the Earth originally, since its birth. It is assumed that the origin of life itself as well as its further evolution was largely determined by the presence of radioactive decay energy. Ours is an empirical approach to the topic, based on the author's own research of radon activity.

Radon is a gas formed by the decay of radioactive radium, which in term is a decay product of uranium present in the earth's crust.

1. On the history issue

Radon gas is colourless, odourless and tasteless; it is soluble in water. Radon is heavier than air and, therefore, when rising from the depths, it can accumulate in the basements of buildings in high concentrations and, penetrating from the cellars to the ground floors, it can pose a great danger to the population.

The history of radon began in the 15th-16th centuries due to one observation: it was high mortality of Austrian miners from a mysterious "mountain sickness" which accompanied the extraction of lead ores. In the 16th century Paracelsus of Switzerland described the disease of miners, but he was not able to explain the cause of it.

In the area of ore mining called Jachimov, the ore was extracted from the surface or shallow undergrounds, but near Schneeberg (Saxony, Germany) the ore was extracted from deep mines which reached a depth of 400 m – it was uranit (Pogosov & Dubkovskiy, 2012, p.25).

Special research works of W. Schuttman and K. Becker were devoted to studying the incidence of lung cancer among residents in South Saxony, where the natural radon concentration is high. For such analysis, the incidence data was used of only women, who, unlike men, did not work in uranium mines. There is evidence that in women from neighbouring provinces, where the uranium is not mined, lung cancer was diagnosed more frequently. These results suggest that lung cancer in women on South Saxony is rarer than in the residents of provinces with low amount of radon in the air (Buldakov & Kalistratova, 2005, p. 41).

After the Second World War, following the directive of the government of the Soviet Union, the intensive uranium production began in 1946 in the historic mining district of Schneeberg (East Germany), and in 1948 – in Bohemia (Czechoslovakia). In the same 1946 uranium mining started in France.

In 1879, F.H. Harting and W. Hesse described in their works an occupational disease of Austrian miners, which was identified as lung cancer. Miners' disease was proved to be associated with their exposure to ionizing radiation and radon short-living decay products that accumulated in the air of poorly ventilated mines (Pogosov & Dubkovskiy, 2012, p.25).

Back in the late 1950s it was first realized that radon was harmful not only for the miners. Despite this, only in 1977 radon has been identified as the main source of danger to the public by the United Nations Scientific Committee on the Effects of Atomic Radiation. According to this UN Scientific Committee on the Effects of Atomic Radiation, approximately 20% of lung cancer in the population is caused by the inhalation of air which contains radon. Since 1987, the International Centre for Research on Cancer (CIRC, Lyon, France) classifies radon decay products as carcinogenes that cause lung cancer in humans.

As to the history of Radioecology – it dates back to the 19th century. One of the possible classifications regarding to the formative stages of this discipline is as follows (Rozenberg & Krasnoshekov, 2007, p. 134).

The 1st period is initial and descriptive (1895-1905). Interpretation is given to the realized discovery of Rontgen (X-rays, as the scientist called them), and to the impact on biological objects.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات