



Radiation Protection and  
Environmental Protection



# We all live in a tide of radiation

The biosphere of the Earth has always lived, and continues to live, with the natural and the man-made radiation conditions which both nature and we produce ourselves. The sources of natural radiation are the cosmos, the Earth's crust and those radionuclides that the crust emits. These used to have an impact about 10 times as much as today, well before the appearance of life on our planet. Mutations driven by radiation may have provided natural selection with a fertile soil and in the course of evolution may have made a contribution to biological diversity. Nevertheless, over the billions of years, life developed biochemical defence mechanisms against ionizing radiation. Natural radioactive materials are constantly and inherently present

in the soil, in construction materials, in the air, in our food, in our drinking water and in our bodies. Nearly 16 million radioactive nuclides decay in our organism every hour. The resulting external and internal exposure to radiation accompanies throughout our lives. The major part - about 65-75% - of the human exposure to natural radiation sources comes from the inhalation of noble gas radon and its daughter elements generated as a product of the decay series of the uranium that is always present in surface rocks, soils and construction materials. The dose from radon is higher the longer the time spent in an inadequately ventilated room. On average, the population of the Earth is exposed to about 2.4 mSv of radiation from natural sources. This value

varies due to the geographical and geological characteristics, the accommodation and building methods, as well as differences in the length of time spent in dwellings. The natural background radiation exposure of the Hungarian population is approximately 20% higher, 3 mSv/year, as in this country people spend relatively more time in buildings.

There are some places on Earth that have much higher concentration of natural radioactive materials (mainly Thorium-compounds) than the average, and there the population's exposure to natural radiation is 5-10 times that of ours and the maximum value may be 50 times higher. However, no evidence of health disorders or pathological abnormalities among the populations of those areas





attributable to the effects of radiation has been detected up to now. Thus, it is safe to say that natural background radiation is not harmful, but remains an inherent part of human life. Since the end of the 19th Century, mankind has been exposed to man-made sources of radiation as well. The first known, and later widely used, was the radiation described by, and named after, Rontgen (x-rays). Today, the overwhelming majority of the exposure of the global population to man-made sources is represented by this type. At present the use of x-rays is still indispensable to us. The invaluable amount of information that we gain with the use of x-rays in the diagnosis of developing, or already developed diseases makes it an affordable risk. In recent years, the medical application of various labelled compounds and radiation therapies has grown dynamically. Due to the medical exposure, we receive an average annual dose of 0.4-5 mSv. The public is also exposed to the radiation of ear-

lier nuclear weapon tests and to the radiation from the facilities of the nuclear industry. The exposure from these sources however, is less than half of one percent of the natural background radiation. The share of the nuclear industry in total public exposure to man-made sources of radiation is negligible. In the vicinity of the Paks nuclear power plant there is no measurable or traceable excess exposure. Compliance with the annual dose limits determined for the plant staff is rigorously monitored and state-of-the-art technology is represented in the radiation protection equipment and procedures. While the mean lifespan of the individual is shortened by 2,000 days through smoking, by 200 days through road accidents and by 20 days due to conventional power plants, the figure in relation to the nuclear industry is only 0,04 days. In addition to the above, risk analyses performed on the increasingly safe nuclear power plants indicate a low probability of a severe accident occurring.

# Environmental protection

Whether we need nuclear energy or not is an often disputed question. Future energy supply is increasingly in the spotlight of both the national and international media.

Mankind requires increasing amounts of energy and, in consequence, global hydrocarbon reserves are decreasing rapidly. The fossil fuels which evolved over hundred million years will soon be depleted, while at the same time we are having to become acquainted with new concepts and phenomena such as the greenhouse

effect, acid rain and holes in the atmospheric ozone, etc. Given the current status of scientific and technical development, there seems to be limited potential for the economic exploitation of the renewable sources of energy in wind, water or solar power. Nuclear power plants - if built to the ultimate and feasible safety levels possible today - are cleaner and more efficient than conventional power plants. MVM Paks Nuclear Power Plant Plc. is the leading electric energy producer in Hungary; its four reactor blocks pro-





vide 40% of the domestic electricity production. MVM Paks NPP Plc. continues to improve its environmental protection activities in all areas; laying the foundations of the long term market position and competitiveness of itself and its business partners. In the focus of the company's vision are the safe operation and the extension of the service lifetimes of the existing blocks and, in the interest of accomplishing those aims, we endeavour to improve our environmental protection activities beyond mere compliance with the environmental protection regulations and rules.

# Nature is our companion

As in previous years, the plant's nuclear environmental protection tasks are based around the control of radioactive emissions, and the assessment of the volume and composition of the emissions, as well as the continuous monitoring of the natural and man-made radiation conditions of the environment.

Measurements show that the plant has no directly measurable impact on the radiation levels of the environment. Excess exposure of the public due to the emissions represents about 1/1,000th of the authorized limits and 1/10,000th of the natural background. Other independent bodies also perform environmental control checks around the Paks nuclear power plant, thus guaranteeing the reliability of the radiation data (Natl. Inst. for Radiobiology and Radiohygiene, local laboratory of the Hungarian Radiological Monitoring Network).



# Nuclear power to protect the atmosphere

Power plants using conventional, fossil fuels consume huge volumes of oxygen. In return, large amounts of carbon- and sulphuric-dioxides are released into the atmosphere; and the negative effects of that are already clear. An increasingly severe situation is being created: for instance, the greenhouse effect generated by the increasing CO<sub>2</sub> concentration in the atmosphere results in the global warming effects on Earth's climate, which may have consequences which are, as yet, beyond our comprehension. In contrast, a nuclear power plant operated responsibly by

highly educated and trained professionals is a clean and environmental friendly facility. It does not consume oxygen nor release carbon-dioxide, sulphur-dioxide, nitrogen-oxides, dust, ash and slag, nor does it contribute to the greenhouse effect which causes global warming. With the four blocks at Paks (2,000 MW total) we save nearly as much oxygen each year as is produced by all the forests in Hungary; more or less equal to the amount of oxygen inhaled annually by the population of the country. MVM Paks Nuclear Power Plant Plc. operates an Environment-Centred



Control System. The system is focused on the continuous development of environmental protection based on the main pillar of the declaration of the environmental protection objectives and the implementation of the programmes established to achieve them.

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# Come, see, and understand!

**Opening times:**

Monday-Friday

**8.00–15.00 hours**

Saturday

**9.00–13.00 hours**



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