

# **RADIATION RISK MONITORING AND ASSESSMENT IN COAL MINING INDUSTRY**

*Boguslaw MICHALIK<sup>1</sup>, Małgorzata WYSOCKA, Krystian SKUBACZ,  
Stanislaw CHAŁUPNIK, Antoni MIELNIKOW*

*Laboratory of Radiometry, CENTRAL MINING INSTITUTE  
40-166 Katowice, Plac Gwarkow 1, POLAND,*

## **Abstract**

The radiation risk due to the exposure to natural radionuclides, especially to short-lived radon progeny, is a component of the radiation hazard, common in the natural environment and working environment of people. The effective dose, caused by the exposure to radon (radon progeny), exceeds 50% of the average dose for a man from all sources of the ionising radiation. Under specific circumstances, for example as a result of working in confined space with low ventilation rate (cellars, underground galleries, tunnels, mines), the risk caused by radon and its progeny can be enhanced and can reach significant levels.

In Polish mining industry the radiation hazard, caused by natural radionuclides is one among many other natural hazards. It is worth to be point out that besides radon another source of radiation hazard in coal mines is radium, present in underground brines. Sediments, precipitated out from such waters, have enhanced radium content and may cause the increase of external gamma radiation dose rate as well as internal contamination due to accidental ingestion or inhalation.

Investigation of that specific problem has been started in hard coal underground mines in Poland in early 1970's. At the end of 1980's the first regulations were issued: the national standard have been prepared, in which dose limits and requirements of the radiation monitoring have been established. In following years in some branches of underground mining (mainly in coal mining industry) internal regulations for monitoring and mitigation measures were developed on the basis of the Polish standard.

Due to being in force regulatory acts - Geological and Mining Law, Decree of the President of State Mining Authority and Decree of the Ministry of Economy – the monitoring and prevention against natural radiation is obligatory in all Polish underground mines since 1989. This duty is strictly supervised by local offices of State Mining Authority in co-operation with other governmental agencies. Monitoring and mitigation measures are obligatory not only for active mines but also for mines, excluded from the exploitation, and used for other purposes as museums, balneotherapy spas etc. Such solution is unique in non-uranium mining.

Far less attention has been paid to environmental burden caused waste with natural radioactivity enhanced due to mining activity. Such waste, mainly sediments differ significantly from "classical" nuclear materials and the derived radiation risk is usually associated with risk caused by other pollutants and can not be controlled applying rules designed for pure radioactive waste. Existing data have pointed out strong needs to take into account mining industry as a special case of radiation risk and enclose them in frame of the formal control. But up to now there are not reasonable and clear regulations in this matter. As a result, the coal mining industry is not aware of problems connected with natural radioactivity or they would expect negative consequences in case of implementing radiation protection measures. The modification of widely comprehended environmental legislation with requirements taken from radiation protection seems to be the first step to solve this problem and make awareness about enhanced natural radioactivity for all stakeholders of concern.

---

<sup>1</sup> Corresponding author : *e-mail: b.michalik@gig.katowice.pl*