

## SOIL RADON ( $^{222}\text{Rn}$ ) CONCENTRATION AS A TOOL FOR MAJOR TECTONIC LINES DETERMINATION IN THE POLISH PART OF THE CARPATHIAN MOUNTAINS.

Leszek Jankowski <sup>(1)</sup>, Sylwia Kowalska <sup>(2)</sup>, Rafał Skupio <sup>(2)</sup>, Marek Dohnalik <sup>(2)</sup>

(1) Polish Geological Institute - National Research Institute, Kraków,

(2) Oil and Gas Institute – National Research Institute, Kraków, Poland, e-mail: kowalska@inig.pl.

One of the essential elements of a petroleum system in the Carpathian mountains and a place where circulation process of fluids and bitumen occurs are major fault zones. These zones tend to be reservoir seals or reservoir migration paths. Recognition of fault type, its strike and locking depth, as well as tectonic system regime, are crucial element for seismic interpretation process. Radon concentration measurements (RAD7 portable spectrometer device) in soil was tested as a tool to verify regional importance and precise localization of the most important tectonic zones in the Polish part of the Carpathians. Measurements were conducted in the areas with well documented tectonic system by means of cartographic field works: in the Lanckorona – Żegocina zone, the Bieszczady melange zone in the Grajcarek tectonic zone, in the Pieniny Klippen Belt and in the area of Węglówka – the northern border-zone of the Central Carpathian's Depression. The obtained results allowed not only for precise localisation of analysed fault zone, but it was also possible to define their hierarchy in Carpathian orogenic wedge. Obtained data show enormous differences of radon exhalation intensity between fault zones and surrounding regions. Our studies showed, that the Grajcarek tectonic zone is much more important migration pathway than normal fault separating Podhale Flysch from the Pieniny Klippen Belt region, as it was fought before. The Grajcarek fault zone, similarly to the Bieszczady melange, seems to be major tectonic zone responsible for creation of the huge tectonic melange of the Pieniny Klippen Belt.

### Key words:

Radon concentration, Carpathian, faults, oil and gas deposits

## INDUSTRIAL MANAGEMENT OF USED DRILLING FLUIDS

M. Uliasz, T. Steliga, S. Błaż, G. Zima, P. Jakubowicz

Oil and Gas Institute – National Research Institute

[uliasz@inig.pl](mailto:uliasz@inig.pl), [steliga@inig.pl](mailto:steliga@inig.pl), [blaz@inig.pl](mailto:blaz@inig.pl), [zima@inig.pl](mailto:zima@inig.pl), [jakubowicz@inig.pl](mailto:jakubowicz@inig.pl)

When drilling a borehole the most frequently used drilling fluids are bentonite and polymer clayless, i.e. inhibited with properties limiting the hydration of clay and shale rocks and for completion of reservoir rocks levels (drill-in fluid), with different compositions and properties.

After drilling a section of a borehole, each of these fluids, along with the carried out drillings (borings), constitutes drilling waste, the amount of which is significant and depends both on the depth and the volume of borehole. The analyses conducted on the basis of industrial data showed that for one linear meter of a vertical borehole the amount of produced drilling waste is at the level of approx. 0.6 m<sup>3</sup>, while their basic part amounting to approx. 60 – 80% comprises used drilling fluids as liquid waste, whereas the remaining part comprises solid waste in the form of borings “covered” with drilling fluid and hydrated sediment removed from the borehole wall. The results of chemical analyses of the produced drilling waste show that it poses a potential threat to the environment as it contains significant amounts of contaminants such as: insoluble substances, dissolved solids (TDS), SPCz, chloride and sulphate ions, dissolved organic carbon (DOC), heavy metals and radioactive elements.

In connection therewith, INiG - PIB has attempted to bind the entirety of drilling fluids containing, in the liquid phase, dispersed polymers and scrubbing materials used to prepare it and to process