



**ID 12**

## **Podpora nemške province Severno Porenje-Vestfalija pri sanaciji opuščenih rudnikov črnega premoga v južno-afriški provinci Mpumalanga**

### **Support for the sanitation of abandoned hard coal mines in South Africa province Mpumalanga from German province Northrhine-Westfalia**

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#### **POVZETEK**

**Ključne besede:** opuščeni rudniki črnega premoga, komorno-steberna odkopna metoda, elektrofilterski pepel iz termoelektrarn, odvodnjavanje.

#### **ABSTRACT**

Germany, especially Northrhine-Westfalia (NRW), has an excellence experience with the closing of coal mines for a long period. Coal mining was moving from north in the Ruhr District which causes closings of coal mines over decades of years. In fact of the dense population in the Ruhr District it was not possible to leave the abandoned mining sites without responsibility. To protect the population it was necessary to secure the abandoned sites. The moving north of coal mining from near surface mining above the groundwater table to extreme deep mining lead to the fact, that all kinds of mine openings are present from small open pits to extreme deep shafts.

Former prime minister of NRW, Johannes Rau, started a partnership with the province Mpumalanga in South Africa direct after the end of the apartheid system. In the frame of this cooperation some travelling politicians from NRW realized, that acid mine drainages from abandoned hard coal mines cause problems with the environment in that area. Mr. Roger Wolf from GIZ (company for international cooperation) and Professor Dr. Frank Otto from TFH Georg Agricola (University of Applied Sciences) prepared a first overview of the problems on demand of the state chancellery of NRW in autumn 2013. In the focus came two kinds of contaminations: First there are the near surface underground openings of

abandoned coal mines which were flooded with rain water. Because of a great amount of Pyrite this water became extreme acid and mineralized. On the other hand there are mountains of fly ashes from burning hard coal deposits beside the power plants. These deposits are open and contaminate the groundwater by leakages as well as the air by dust.

The Council for Geoscience in South Africa has the idea to fill the openings of room-and-pillar mining with a suspension from the fly ashes. With this system the openings cannot collapse anymore and there will be less surface to contaminate rain and groundwater with Pyrite and heavy metals. A second research trip was embedded in the student's excursion end of May, beginning of June 2014. In winter semester 2014/2015 first laboratory tests were done in Bochum with fly ashes from a German power plant to optimize the suspension and see the stability of the hardened material. With these results a next step for cooperation between Mpumalanga and NRW should be started in 2015.

**Key words:** abandoned hard coal mines, room-and-pillar-mining, fly ashes from thermal power plants, acid mine drainage.