

Construction of ventilation shafts in a salt mine by solution mining

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Abstract

The Sigmundshall potash mine (near Hannover, Northern Germany) is located in the Bokeloh salt dome, which is part of the Central European Zechstein Basin. As a result of more than 100 years of mining, the deepest mining level is now at a depth of 1400 m. During the development of this mining level towards the margins of the salt dome, it has been, and will be, necessary to build fresh air connections to the overlying fully developed level. In the past this has been established by conventional upwards drilling over a vertical distance of 250 m. Up to the completion of the ventilation shaft, all driving operations had to be stopped.

To accelerate the driving process on the lowest level, the method of constructing the ventilation shafts between the two mining levels has been changed for the first time from conventional drilling upwards to slim-hole drilling downwards and subsequent enlargement of the hole by solution mining. Up to now, two holes with a diameter of about 2.2 m were finished by solution mining, four additional holes are planned.

The construction of the first ventilation hole by solution mining started in July 2007 and took 14 months to be ready. Due to unintended deviation of the initial borehole from the vertical and because of irregularities of the 'cavern' shape development, several problems had to be solved. The completion of the second ventilation hole was less problematical.

This paper gives a brief overview of the technical challenges in developing an alternative concept for the creation of ventilation shafts in a salt mine. Special focus is put on the cavern development compared to "normal" brine producing or storage caverns.

Key words: Potash Mine, Ventilation shafts, Caverns for fresh air supply, Zechstein, Stassfurt Rocksalt, Solution mining, Leaching technology.