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RESEARCH AND APPLICATION OF QUICK-SPEED SOLUTION MINING TECHNOLOGY OF MULTI-LAYER GAS STORAGE IN SALT CAVERNS IN CHINA

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Abstract

For the storage of gas, salt caverns are constructed in a bedded, multi-layered salt deposit with only low-grade rock salt in China. The depth of the salt deposit ranges from 1,000 m in Jintan (Jiangsu Province) to 2,000 m in Jianghan (Hubei Province). The average thickness of the salt deposit is about 160 m. The speed of solution mining is low. Thus, about four years are needed to build a salt cavern with a volume of about 200,000 m³. This does not meet the Chinese demand for the quick construction of caverns for the storage of large volumes of gas. There is an urgent need for new mining methods to accelerate solution mining in multi-layered salt deposits for the construction of caverns.

In the present paper, currently applied solution mining technologies for salt cavern construction to store natural gas in China are introduced. Four of the applied methods of quick-speed solution mining are herein presented and evaluated, which are 1.) underreaming, 2.) solution mining (jetting) tools, 3.) solution mining with large borehole diameter and 4.) solution mining with two wells.

Quick-speed solution mining technology is important to reduce the solution mining period, to save money and to improve the construction effectiveness for gas storage in salt caverns in China.

Key words: Gas Storage, Salt Cavern, Solution Mining, Quick-speed