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Permanent Blanket-Brine Interface monitoring by temperature monitoring in Salt Caverns

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Abstract

The solution mining process for salt production in caverns must be controlled to reach an optimal yield, and to get a high mechanical stability of the produced cavern. In order to prevent uncontrolled washing in the top of the cavern during continuation of the process, a so-called blanket will be filled into the cavern. Mostly a special mineral oil is used for it, because it swims on the brine.

During the solution mining process the level of the blanket-brine interface can changes; therefore it is very important, to permanently know whose position (depth), in order to be able to intervene.

A monitoring system using the distributed fiber-optic temperature sensing technology is developed by GESO GmbH Jena in collaboration with experts of the esco - european salt company GmbH & Co. KG, Werk Bernburg, Germany.

A special fiber-optic sensing cable will be installed into the annulus of the well during the construction period, or during a work over period.

Using the difference of the thermal conductivity between brine and mineral oil the position (depth) of the interface can be pinpointed. The value of the interface depth will be evaluate quasi continuously.

The blanket-brine interface monitoring system can work over the whole period of the cavern leaching process while the sensing cable is installed in the borehole. It's possible to monitor up to 8 caverns simultaneously with one central processing unit.

Key words: Cavern Development, Caverns for Brine Extraction, Instrumentation and Monitoring