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Efficient and Tailor-made Cavern Construction in Domal Salt for Long Term Oil Storage

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Abstract

Strategic stockpiling of crude oil has become again a crucial issue for most industrialized nations that are dependant on oil imports. The demand for big long term storage volumes stays in close relation to disturbances on the oil market and in world politics.

When IVG Logistik GmbH was asked by a European crude oil stockpiling agency in the end of 2002 to construct a new cavern at the Etzel salt dome in north-western Germany IVG was very keen on complying with the customers demand. After signing a storage contract IVG started the cavern project K202 in January 2003 with an ambitious schedule. Because of IVG´s position of holding a general privilege for cavern development on one hand and of using existing aboveground infrastructure for solution mining on the other, engineering instantly concentrated on establishing a cavern borehole at a geological suitable location applying directional drilling techniques. Simultaneously the future cavity was designed according to proven geomechanical standards. After drilling, aboveground installations and tests were finished solution mining at K202 commenced in October 2003. In the early stage of cavern development a down-hole radar (EMR) survey was performed in order to investigate the internal structure of the salt formation in the vicinity of the cavern axis. From the survey conclusions were drawn to improve the geological model of the cavern location and to plan and control the further solution mining process.

In the course of cavern mining the customer came up with a request to increase the storage volume from original 300.000 up to 500.000 m³. In the early stage of cavity development it was possible for IVG to adapt the solution mining procedure in order to create a larger volume especially in the upper part of the cavern. Furthermore, an intermediate, early oil filling step became possible prior to conclusion of solution mining that is planned for fall 2005.

Because of the favorable overall conditions at the Etzel site IVG was able to match the customer requirements for efficient cavern development and economical long term storage.

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