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Innovative Concepts of Re-completing Oil Storage Caverns

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Abstract

This technical paper outlines the innovative concepts of recompleting existing oil caverns in Europe.

Most of the caverns that have been built during the late 60's and in to 1990 have been completed without any safety annulus to observe the integrity of the last cemented casing.

The philosophy of cavern operators and the approach of mining authorities have changed within the last five to ten years. UGS responsively developed new concepts for recompleting existing oil caverns.

The challenge for those concepts is the need of the operator to comply with the new barrier standards, the oil production at high rates from the caverns, the long term reliability of minimum 30 years and the financial situation of the industry.

The key challenges are:

Minimising the environmental impact
Recompletion over oil filled caverns
Maximum oil production rates
Suitable testing procedures of the last cemented casing, casing shoe and the installation
Casing inspection procedures
Analysis of stresses due to subsidence
Minimising the finical impact

The presentation gives an overview of different standards of completions. In general it shows the advantages and disadvantages of a standard design, liner completion, slim hole design and double packer design.

All those designs have been realized in different areas of Europe, the presentation will also include operational experiences from the realization phase.

Key words: Oil Leak; MIT; Tightness Test; Troubleshooting; Salt Cavern; National Oil Reserves; Oil Cavern; Gas Test; Hydraulic Test; Leak Test; Leak Detection; Barrier; Nitrogen Test; Monitoring; Completion