

A HYDRAULIC MECHANICAL INTEGRITY TEST OF AN OIL CAVERN USING THE SOMIT METHOD

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Abstract

The mechanical integrity of the access borehole to the cavern needs to be confirmed to guarantee safe cavern storage operations and secure isolation of the stored product. Mechanical integrity testing (MIT) is therefore part of the standard cavern acceptance procedure. Different kinds of interface tests are utilised on gas storage cavern wells. The SoMIT (sonar mechanical integrity testing) is an advanced kind of gas interface test – and has been qualified in several European projects. It is utilised in particular when high accuracy and short test durations are required. During the test, the interface depth between the test medium and brine is continuously monitored with an ultrasonic logging tool /1/.

Instead of using the usual gaseous test medium, the SoMIT method was adapted for the first time to use a hydraulic test medium (oil) in order to verify the integrity of the area around the last cemented casing shoe of an oil storage cavern well. The planning, preparation and technical supervision was performed by KBB Underground Technologies GmbH. The preparations for this MIT included pre-pressurising the solution-mined cavern with saturated brine, and injecting oil to adjust the interface level below the last cemented casing shoe. The interface level depth was then continuously observed with the ultrasonic logging tool.

This paper gives an insight into the hydraulic SoMIT using oil as a test medium before storage operations. The general test programme, the test performance and the evaluation of the SoMIT are discussed. As a brief summary, it can be stated that the method produced advantages such as improved accuracy, reduced test duration, and therefore higher efficiency – which led overall to lower costs and to the successful execution of the SoMIT method.

Key words: Cavern Testing, Caverns for Liquid Storage, MIT (Mechanical Integrity Test), Sonar, SoMIT, Storage Cavern, Well Logging