

## TEMPERATURE LOGGING FOR LEAK DETECTION IN GAS CAVERNS

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### Abstract

The temperature distribution inside an underground storage facility and its variation with time are key parameters for assessing and surveying the operating conditions.

Temperature distribution measurements made simultaneously along the full length of a production string under varying operating conditions and especially before, during and after pressure drawdown in the annulus provide detailed information on temperature anomalies which may be due to leaks in the production string (e.g. at corrosion pits, collars, screwings, simple or over-shot sealing units and travel joints), to leaks in the casing or to gas flow behind the casing. Because of the Joule-Thomson effect, any leak will result in a temperature drop. By comparison with defined starting temperature conditions, leaks can thus easily be detected and located.

While conventional temperature well logging gives the temperature only at one point at a discrete time, the fibre-optic temperature sensing technique allows to measure the temperature vs. depth and time simultaneously for the full length of a production string with a high depth and temperature resolution. This method of leak detection is now well established in practice.

Since 2003 GESO and SOCON offer a professional service of temperature logging for leak detection in gas caverns. In this time a lot of temperature loggings in gas caverns were carried out. The paper gives an overview about the main results obtained so far. Selected examples show the efficiency of this method.

**Key words:** Caverns for Gas Storage, Instrumentation and Monitoring, Leak, Well Logging