

Solution Mining Research Institute, Spring 2007 Technical Meeting  
Basel, Switzerland, April 30<sup>th</sup> - May 1<sup>st</sup>

## **In-situ Test with a Gas Storage Cavern as a Basis for Optimization**

Reinhard Rokahr<sup>1</sup>, Kurt Staudtmeister<sup>1</sup>, Dirk Zander- Schiebenhöfer<sup>1</sup>, Jørgen I. Johansen<sup>2</sup>

<sup>1</sup> Institut für Unterirdisches Bauen (IUB) - Leibniz Universität Hannover  
Welfengarten 1a, D 30167 Hannover, Germany

<sup>2</sup> DONG Energy A/S (until April 30<sup>th</sup>, 2007) Energienet.dk (from May 1<sup>st</sup>, 2007)  
Rækkeborgvej 4, DK 9620 Ålestrup, Denmark

### **Abstract**

The cavern facility at Lille Torup, Denmark, is operated by DONG for more than 20 years for the storage of natural gas. Based on this experience from operations DONG intended to check the layout of the caverns with respect to a potential of optimization and therefore launched a rock mechanical investigation.

As a part of this rock mechanical study an in-situ test with cavern TO6 had been carried out in order to check the global creep behaviour of the surrounding rock salt mass and the strength of the rock salt at cavern wall at pressure conditions below the so far operated minimum cavern pressure. The period at this tested minimum cavern pressure took about 4 weeks.

In order to check the cavern wall integrity high precision sonar surveys had been carried out in a reference section of the cavern at the beginning and at the end of the test.

In the paper the results of the in-situ test will be presented. The evaluation is given by means of the interpretation of the sonar measurements and the results of a numerical back-analysis of the test. This leads to the findings to be incorporated in a concept for the optimization of the layout of the caverns a Lille Torup.

Keywords: *cavern testing, rock mechanics, back analysis and interpretation*