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## **THERMO-MECHANICAL BEHAVIOR OF STUBLACH GAS STORAGE CAVERNS**

Cyrille Pellizzaro, Storengy, Bois-Colombes, France  
Gautier Bergeret, Storengy, Bois-Colombes, France  
Alan Leadbetter, Storengy UK, Northwich, United Kingdom  
Yvan Charnavel, Storengy, Bois-Colombes, France

### **Abstract**

Storengy UK is currently developing the Stublach Gas Storage Project, a salt cavern storage facility in Cheshire. Once completed, the scheme will be one of the main storage facilities in the country and will enhance the security of supply to the UK market. Up to 28 caverns will be created, the first 10 of which are currently being solution-mined and will be commissioned from 2013. Total storage capacity could reach 400 million cubic meters (14 Bcf) of natural gas.

For optimal energy trading reasons, Stublach caverns are planned to be operated on a fast cycling basis : one part of their volume is cycled every week. This results in rapid pressure variations within the cavern, in addition to large gas temperature changes, which then spread out into the salt mass. From the rock mechanical point of view, the fact that the caverns are shallow (500 m / 1650 ft) enhances the likelihood of opening thermally induced fractures at cavern wall.

The paper, using thermo-mechanical calculations, aims at assessing the stability of the caverns regarding usual mechanical criteria, and tries to evaluate the probable consequences beyond fracture opening.

**Key words** : caverns for gas storage, cyclic loading, thermo-mechanics, tensile stress, crack, rock mechanics, Stublach, United Kingdom

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