

FRAC-PRESSURE RISK IN ROCK SALT

by

Manfred Wallner

Bundesanstalt für Geowissenschaften und Rohstoffe

ABSTRACT

The mechanical behavior of rock salt is dominated by creep deformations. Due to this favorable rheological property, fracture phenomena only occur at relatively high loading rates and under almost uniaxial stress conditions. Constitutive equations describing the complete mechanical behavior of rock salt are available from extensive laboratory testing.

A reliable computational model is used to study the hydro-frac problem in details. Frac-pressure depends on natural conditions as well as on the test procedure itself. Beside the mechanical properties of the surrounding rock salt and the existing stress field, the frac-pressure specifically depends on the fluid pressurization rate.

The different loading rates in a hydro-frac test and an encapsulated liquid with natural fluid pressurization lead to a different rock response. In case of a relative low pressurization rate, no tensile stresses occur in the adjacent rock because creep enables the rock to relax stresses and to behave like a viscos material.