

Impact of tensile strength anisotropy on fracturing pressure of Svalbard sandstone and shale cap rocks

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ABSTRACT

This paper presents results of the laboratory tests for determining the tensile strength of anisotropic shale samples cored from Aagardhfjell Formation in Longyearbyen, Svalbard. This formation is considered as seal for the suggested CO₂ storage reservoir. Therefore, it is essential to characterize and investigate behavior of the shale under storage conditions. This study includes results and analysis of Brazilian indirect tensile strength of cores parallel and perpendicular to bedding. The results are analyzed to incorporate in the calculation of the fracture pressure of shale formation and to determine formation fracture gradient in the wells. Because of significant burial and uplift of the Barents Sea region, the shale exhibits very high tensile strength and strong anisotropy.

An example of the impact of tensile strength anisotropy on the fracture pressure of shale formation has been assessed. The results of this study suggest that the tensile strength of rock has significant impact on fracture pressure and the orientation of fractures.