

Bed-parallel expansion seams and shear surfaces in shales

W. Jamison¹

¹*Shell Canada & The Upper Crust Inc.*

Abstract

Bed-parallel expansion seams, a.k.a. "beef", are common in many organic-rich shales. They have been recognized in shales since the mid-19th century, and the origin of these features has been contemplated for almost a century. They have been the subject of renewed interest with the current interest in shales as a reservoir rock for gas and liquid hydrocarbons,. Recent studies suggest these features formed in response to extreme overpressures that developed when kerogens were converted to hydrocarbons. The preferential development of expansion seams over vertical fractures can be explained using a model of uniaxial strain.

Bed-parallel shear zones or slip surfaces are also common in some shales. These shear features have a morphology different and distinct from expansion seams, but the two fabrics are commonly observed to be intercalated. These shear features are inferred to have formed in tectonic settings and/or structural positions where bed-parallel shear occurred within the time of catagenesis. The bed-parallel shear features commonly contain surfaces that have little or no cohesion, and they could create impediments to the vertical propagation of hydraulic fractures.