Mechanically-Partitioned Deformation Related to Reactivated Oblique Slip Faults, Pecos River Canyon

Gordon Smith¹, Chris Zahm², and Charles Kerans³

¹BHP Billiton, 1360 Post Oak Blvd., Houston, Texas 77056, U.S.A.
²Bureau of Economic Geology, Jackson School of Geosciences, University of Texas at Austin, University Station, Box X, Austin, Texas 78713–8924, U.S.A.
³Department of Geological Sciences, University of Texas at Austin, 1 University Station C1100, Austin, Texas 78712, U.S.A.

GCAGS Explore & Discover Article #00168*
Posted September 13, 2016.

*Abstract extracted from a full paper published in the GCAGS Journal (see footnote reference below), which is available as part of the entire 2016 GCAGS Journal volume via the GCAGS Bookstore at the Bureau of Economic Geology (www.beg.utexas.edu) or as an individual open-access document via www.gcags.org.

ABSTRACT

Pre-existing structural elements can have profound effects on fracture and fault development in younger strata, especially in areas that undergo significant changes in tectonic setting due to reactivation along older structures. Increased fracture development around the faults may be difficult to detect in subsurface data, but highlights the volumetric extent of deformation within the fault damage zone and gives insight into the potential reservoir permeability impact faults may have in the subsurface. Observations of fracture style in outcrop can provide evidence of the conditions the fracture set developed within (e.g., extension, shear, or compressional). Moreover, fault-related fractures can vary in their intensity based on the mechanical properties of the host rock.

The focus of this study centers on the effects of potentially-reactivated Paleozoic faults along the Devils River Uplift on the development of faults and fractures in Cretaceous strata. Fault and fracture data were characterized in carbonate outcrop exposures with stratigraphic layers of varying mechanical properties. Additionally, this work inspects the impact of small faults on fracture development within variable strength strata as well as the role of mechanical stratigraphy on fault and fracture styles with specific attention given to the effect of diageneric fabrics on fracture densities.