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THE USE OF MEASUREMENTS MADE ON DRILL CUTTINGS TO CONSTRUCT AND APPLY GEOMECHANICAL WELL PROFILES

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ABSTRACT
The placement of hydraulic fracture stages along a horizontal well can be guided in part by an understanding of geomechanical variability along and around the wellbore. In theory, this variability can have implications for variability in nearwellbore stress conditions and for the behavior of hydraulic fractures during the early stages of pumping a hydraulic fracture treatment. This awareness has led to efforts to engineer completions designs to better suit the observed formation heterogeneity along the well. When data is available, a geomechanical well profile can be used to increase the likelihood that fractures will be initiated in locations where fracture initiation and growth will be easiest. These profiles require a sufficiently high-resolution characterization of reservoir quality and of geomechanical properties along the well. In this paper, we investigate the utility of drill cuttings as a source of this data by using instrumented indentation measurements. We show data from a multi-well project in the Eagleford Shale that in layered heterogeneous formations cuttings can provide the necessary constraints on the degree to which near wellbore stresses may be partitioned by the rock. This in turn can help to address some aspects of the engineered completions objective.

INTRODUCTION
Many lines of evidence suggest that despite the significant advances made in recent decades to improve the effectiveness of multi-stage horizontal well completions, many wells produce at rates that are well below their potential. Production logging (fibre optic temperature logging, production logging, chemical tracers, etc.) has confirmed this and demonstrated that even the best wells in a field contain stages, sometimes many stages, which are contributing little or nothing to the production of the well (e.g. Cadwallader et al, 2015). Attempts to improve this situation require reliable data that can tell us something that we don’t already know and that can allow meaningful optimization decisions to be made without significantly increasing costs or risks.

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