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Buddy McDaniel[1], D. E. McMechan[1], N. A. Stegent[1] (1) SPE, Halliburton Energy Services, Inc, Duncan, OK

Proper Use of Proppant Slugs and Viscous Gel Slugs can Improve Proppant Placement during Hydraulic Fracturing Applications

This paper presents an analysis of the stress and pressurehanges caused by hydraulic fractures and evaluates the likelihood and causes of microseismic activity in the vicinity of the fracture. Coupled with the formation stresses, pressure, and properties, the analysis predicts where microseisms should occur in relation to the fracture and makes possible accurate interpretation of the significance of the microseismic events. The most important factor controlling the seismically active zone is the coupling of the fracturing pressure into the formation. Thus, liquid -saturated reservoirs experience much more widespread activity than gas reservoirs. The analysis also shows that the fracture tip induces large shear stresses that result in a local zone of instability. Such a zone is the primary reason that microseisms accurately map out the length and height of the fracture since considerable microseismic activity occurs round the tip as it propagates.