Suppression of the Saffman-Taylor instability through injection of a finite slug of polymer[1] TIMOTHY H. BEESON-JONES, ANDREW W. WOODS, BPI Institute, University of Cambridge, UK — During secondary oil recovery, relatively mobile water can channel through oil owing to the Saffman-Taylor instability. Injection of a finite slug of polymer solution from a central well prior to the water flood suppresses the growth of the instability by reducing the adverse mobility ratio at the leading interface. A linear stability analysis of an axisymmetric base state identifies how perturbations on the leading and trailing interfaces become coupled. It also reveals the dependence of the long-time algebraic growth of each mode on the mobility ratios across the two interfaces. The viscosity of the polymer solution which minimizes the growth rate of the instability is identified, and the impact of different slug sizes on this growth is described.

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