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The Challenge of Heavy Oil Fluid Characterization

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The characterization of heavy oil for modeling fluid behavior is challenging because so little of the fluid can be assayed with conventional methods such as distillation and gas chromatography. Recent progress in this area is reviewed focusing on heavy oil characterization for: robust equation of state models, asphaltene precipitation, and viscosity prediction. An extended characterization methodology is presented with validation from a new deep vacuum fractionation assay. The performance of a cubic equation of state model constructed from the characterization is tested on a wide range of heavy oil phase behavior. Deficiencies and alternatives for fluid characterization for asphaltene precipitation modeling are outlined. The prediction of heavy oil viscosity from a fluid characterization is demonstrated and the data requirements for accurate viscosity prediction are discussed.