Driving Force for Uinta's Lacustrine Shale Oil with Lower GOR

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Abstract

The recent resurgence interest in Uinta shale oil comes with a hidden feature, i.e., lower Gas to Oil Ratio (GOR) Black shale oil. The production features lower GOR, and high oil rate and slower decline than the marine shale oil with higher GOR, higher initial oil rate but faster decline along with faster rise of GOR. We discuss what are the driving forces that made such a difference. The low GOR Black Shale Oil (LGBSO) has long been considered as difficult to produce than the counter-part, i.e. High GOR Light Tight Oil (HGLTO), using the conventional wisdom for shale and tight oil, i.e. viscosity dominating the production. In reality, several basins with LGBSO, including Uinta and Vaca Muerta, have superior production than HGLTO in the most prolific marine shale oil basins in North America. We present a model discussing the viscosity dominating myth and showing why solution gas expansion is actually the more important factor and why LGBSO outperforms. We also present an isotope-maturity-GOR-PVT model that help the delineation of such low GOR black oil, i.e. finding the real maturity and optimal shale oil with low GOR. We use the available isotope, wetness, and other geological data from Uinta, Vaca Muerta and similar lacustrine basins. The data are fit into our models, and compare the possible GOR distributions and implications.