Title of article: Application of Prediction Models to Performance of High Paraffinic Content Oilfields: Case Study Shen-95 Block of Jinganbao Oilfield

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Abstract

Production performance was curve-fitted for prediction of production and estimation of incremental recovery for waterflooded reservoir. Arguably, simulation may yield non-unique solution or fail due to assumptions on the true effect of high-paraffin content on porosity, saturation, and fluid rheology in the entire formation caused by temperature and solubility effects. The curve-fitting models applied are Arps' rate–time models and Li–Horne mechanistic model proven applicable to waterflooded and naturally fractured reservoirs. Others are Corrêa's volumetric oil-cut decline model tested on heterogeneous, waterflooded, high viscous and heavy oil reservoirs characterized by volumetric exponential decline and a water displacement curve method. The match periods for Arps' models were constrained by criteria from literature reviewed to ensure that decline was relatively under the influence of relative permeability and not operational changes. The models were chosen to match performance primarily of Shen95 Block, a faulted block in the Damintun depression, Liaohe basin, China, characterized by high pour point within 42–64 °C. Recovery estimate was not entirely consistent with past findings of Li–Horne model estimates falling inbetween exponential and harmonic decline estimates, but consistent with harmonic decline estimates. Performance match preference was Corrêa's model, but the model was extended to specifically characterize performance trend by reciprocal decline exponent ($\beta=-2$) beyond the prior considered range of ($-1\leq\beta\leq0$). The other block considered, a naturally fractured reservoir having similar fluid properties with Shen95 was also characterized by ($\beta=-2$). A holistic approach will require the alternate use of the models based on the strong points of each model according to theory, performance trends and operational changes.