**Title of article:** Optimal Well Utilization under Uncertainty for Naturally Depleted and Waterflooded Reservoir

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**Abstract**

Expected monetary value (EMV) or risked net present value (NPV) is the basis used in this study to maximize well utilization with a focus on evaluating optimal sidetrack time. Sidetrack from a production well (and injection well) depending on the recovery mechanism is meant to exploit by-passed reserves and/or isolated marginal reserves. Production from the main wellbore exploiting a lower horizon is commingled with that from a secondary wellbore (sidetrack) exploiting a higher horizon. The problem can be adapted to sequential production from both horizons.

Decision analysis, Monte-Carlo Simulation, time value of money and production forecast by Arps’ rate-time model and 1-Dimensional frontal displacement model are applied in-view of optimizing sidetrack time in a spreadsheet. Uncertainty of the effect of the sidetrack operation on production and that of economic and reservoir parameters were incorporated into the analysis.

Optimal sidetrack time is highly dependent on the probability of success of the sidetrack while the decision to sidetrack is more profitable over the no-sidetrack option for the cases studied. For application to multi-well systems, a tank-model approach may be favorable, consisting of multi-tank model based on a transfer coefficient for inter-tank interaction/transmissibility.