

# Alternative Completion Method for Horizontal Well Production Optimization: Simulation and Field Results

Ahmed Alshmakhy<sup>1</sup> and Ahmed Amtereg<sup>2</sup>

<sup>1</sup>ADCO, Abu Dhabi, United Arab Emirates.

<sup>2</sup>Schlumberger, Abu Dhabi, United Arab Emirates.

## ABSTRACT

Horizontal well drilling advanced recently, and drilled extensively with expectation of linear productivity increase. In reality many wells showed more production from heel side as witnessed by production surveys. The effect of introduced friction losses become critical when applied drawdown is closer to expected pressure losses making it difficult to produce away from heel. Multi segmented well technique was used in a full field simulation study to determine and evaluate alternative methods of completion to optimize production from horizontal wells in carbonate reservoirs. Commonly open hole wells suffer from limited accessibility, uneven contribution and rapid increase in water-cut due to high drawdown around heel. The simulation model was tuned to match the production test results and the expected pressure profile using multi-segmented well technique. The model was then used to select appropriate method as an alternative horizontal well completion and demonstrated the value in terms of oil gain and water reduction and improved well accessibility. Simulation cases and several production logging results in horizontal wells have been studied and all indicated higher productivity at heel versus toe using conventional single completion technique. Some wells produced at toe less than 20 percent relative to heel production. Simulation showed an increased well productivity with multiple entry points, at heel and toe,. In addition it improved well accessibility and enhanced skin towards toe improving well productivity confirmed by field results. The studied alternative method aims to encourage flow from both wings (compartments) of the well with simple dual completion configuration. This leads to less toe/heel effects. Also, it provides control on gas or water coning which results in lost wells especially when high permeability zones exist at heel. Other potential benefits include horizontal hole accessibility improvement, even and effective stimulation, less congested area/Anti-Collision risk and reduced well cost.