

Unlocking Reserves From a Secondary Reservoir in a Mature Field Through Integration and Engineering Approach: A Case Study From Oriente Basin, M-2 Reservoir, Eden-Yuturi Oilfield, Ecuador

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ABSTRACT

This presentation will offer an analysis of the results of several different completion techniques applied to a secondary reservoir in a mature field. These analyses allowed for the selection of the most effective solution for the development of what had been considered a secondary reservoir, optimizing the oil potential of the reservoir and its associated reserves by providing a reduction in workover time and incremental production through the use of an integrated engineering approach. The re-evaluation of the oil potential of this secondary laminated reservoir and its proper development was achieved through selecting the right technology after 15 hydraulic fractures, 13 perforations with propellant, and 8 high density shot perforations. The input data includes the integration of a detailed geological description, petrophysical evaluation and a reservoir characterization added to pre and post evaluations of the completion techniques supported by production results. Comparing the results as a function of the completion design and its reservoir characteristics helped to determine the right completion scheme for the reservoir in terms of productivity and economics. The integration of the inputs and outcomes of each completion system showed that hydraulic fracturing is the most suitable method to unlock the oil potential and reserves of M-2 reservoir due to the higher productivity it creates and the sustained oil rates seen over time. The technique showed up to a 100% increase in oil production with unaltered water cut levels, which indicates that the fracture has contacted and connected multiple laminated oil-bearing sands. The suggested technique is supported by an optimal correlation between reservoir characteristics, oil productivity and constitutive laws. The fracturing process was continuously optimized until reaching the planned objectives for the reservoir. The new oil potential, added to the lower water cut of the reservoir, also helped to reduce bottlenecks at surface facilities, which are currently at limit conditions due to high water production from the main reservoirs. Finally, the optimization process resulted in savings at OPEX and CAPEX levels.