Sand control study provides slotted liner design for improved performance of wells in both hot and cold production conditions

THE CHALLENGE
A Joint Venture Company located in the Orinoco Oil Belt—East Venezuela, has been exploiting and developing an extra-heavy oil field since 1999 using a production scheme based on natural depletion, or “cold production”. The associated recovery factor for the current cold production technology had been calculated at between 2%-4%.

A Thermal Enhanced Oil Recovery (EOR) Pilot Project was launched in 2006, in order to increase the crude oil that could be extracted by applying different steam injection techniques. One of the main issues was the presence of sanding or plugging events taking place during the cold production phase. As a result, the Company’s EOR team focused its attention on sand control design and finding a solution that could deliver acceptable performance under both cold and hot production conditions of the project, while reducing the well intervention rates for sand cleanouts or well stimulations.

THE SOLUTION
A Sand Control Study for designing an optimized slotted liner geometry to be used in the Thermal EOR Pilot Project wells, considering the following activities:

- Sand and Reservoir Characterization
- Slot Flow Testing
- Sand Completions Modelling & Design (FEA)

THE RESULTS
RGL conducted a sand control study based on reservoir data, core data, PSD data, expected production rates and wellbore data; to determine a single slotted liner geometry (slot width, length, type, density and pattern) for all 3 steam injection mechanisms to be applied in the project area, as requested. The optimized design showed a low pressure drop and fines production under multiphase slot flow testing of the cores, acceptable FEA performance under thermal loads as well as acceptable skin factor due to flow convergence. Such recommendation was approved by the Company’s EOR Team to be implemented for 11 wells (SAGD, HASD and Steam Drive).

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