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Pilot EOR Feasibility Study in deltaic channel sands

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Primary recovery in deltaic and turbiditic reservoirs in the prolific Southern Basin generally range from 10-18% for a solution gas drive. Overall recovery from conventional primary recovery operations has been low, leaving a considerable oil resource available for secondary and tertiary oil recovery. EOR has the potential to increase recovery factors. Hence, a recent feasibility study was conducted within one of Trinidad's southern onshore asset via a geology-based simulation software Baker Hughes Jewel Suite.

The purpose of the model was to recommend an EOR method that would maximize the oil recovery from this reservoir. A static 3D model comprising faults and stratigraphic surfaces was constructed for the area followed by iterative reservoir simulation exercises. Petrophysical analysis controlled the interpolation process between wells and the reservoir parameter distributions populated the grid. Permeability was defined by a relationship to VShale using data from an offset field.

The reservoir properties were screened using an EOR technical criteria matrix augmented by EOR historical terms of reference, to determine the most suitable EOR method. EOR screening results favored water/polymer flooding as most suitable for the specific reservoir. Simulation results revealed that recovery factors can be increased by 3-5%, maximizing the overall recovery to 44.5%, using polymer/water injection with a combination of new and existing wells as offtakes.

New surface and subsurface infrastructure would be required to optimally and safely deliver this EOR project, due to the pre-existing aged infrastructure and associated mechanical and HSSE risks. Although the latter negatively affect the project NPV and IRR, the technical analysis demonstrates that EOR in the Southern Basin can boost production.