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Flow Assurance Challenges in the Papa-Terra Project

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Abstract

The Papa-Terra project is among the most complex subsea developments executed in Brazil. Flow assurance strategies were a key driver because of the extreme water depth, the high viscosity and low API (<15 API) of the produced fluids. Petrobras has been considering the first TLWP, which will be installed 350 m away from a FPSO, with multiphase flow between units.

This project demanded a new approach on fluid behavior model and the adoption of some technologies not applied in the Campos Basin yet due mainly to emulsion impact in fluid viscosity. For example of these technologies are a dry completion unit with high power ESP's installed in deep water (4000 ft) and electrical heated flexible pipes. As another example the studies resulted in a new fluid model to be used in flow simulator that considers viscosity data measured in laboratory.

This paper gives an overview of the main flow assurance challenges faced on the basic project development, that include heavy oil modeling applied to an offshore deepwater field, multiphase flow transport between two production units (DCU and FPU) and dry completion unit using high power ESP as lift method.

Introduction

The Papa-Terra field is located offshore on south of Campos Basin, approximately 110 km from the coast of Cabo Frio, at Rio de Janeiro State, under 400 to 1400 meters of water depth (Figure 01). The field is at the Exploratory Block BC-20, 100 km south west from Petrobras Pampo's platform. It's a joint venture between Petrobras - responsible for the operation- and Chevron.

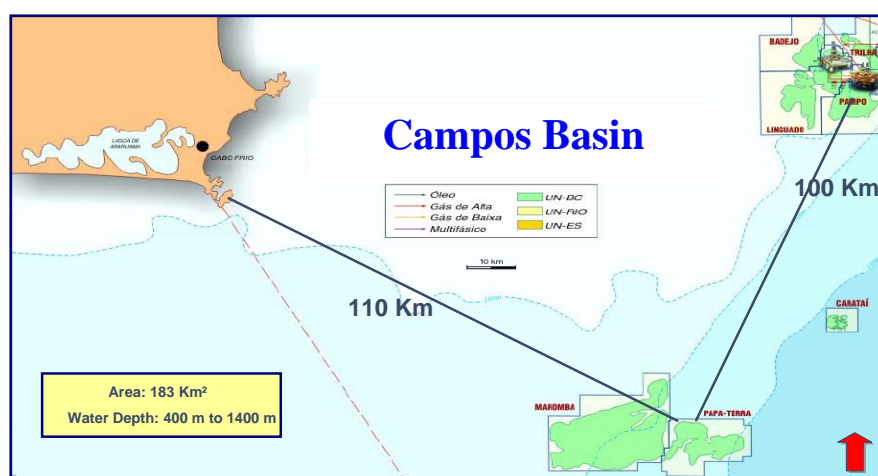


Figure 01 – Field Location