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## Albacora Leste Deep Water Field: Improvements On Well Construction

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### Abstract

Albacora Leste (ABL) Oil Field development, in Campos Basin, is based upon the exploitation of a heavy oil (16.5 to 21.5° API) from a miocene highly unconsolidated sandstone, which depositional model is interpreted as a complex turbidity system, mainly represented by channels, lobes and overbank facies. Water depth ranges from 800 to 2,000m and net thickness from 5 to 35m. The existing interbeds, both due to shale or dirty sands on the channel borders, give additional complexity to the well construction related to well placement strategy and sand control execution.

The implementations made by the construction of 30 horizontal wells (being 16 producers and 14 injectors) are described in the paper. Amongst the most important items are the modifications on TSR, allowing one-trip production string installation, the massive application of front end directional and MWD/LWD technologies, resulting in successful landing and navigation in the reservoir, and the use of support ROV vessels to deploy and retrieve the transponders. All the above implementations increased reliability of offshore operations.

The paper also describes the experience in integrated drilling and completion project (meaning integrated commitment from service companies) and the follow-up of a pending item list.

As a main contribution to the industry, one can mention the implementation of a "Torpedo Base" replacing jetting 30" casing, which reduces rig operational time. Furthermore, the use of light proppant, to pack the screens, opens up new horizons to the construction of long horizontal wells, which are highly desirable in the exploitation of future heavy oil fields.

### Introduction

ABL deep water giant oil field is located on the northern part of Campos Basin, southeast of Brazil, about 120km from the

São Tomé Cape, Rio de Janeiro State coast, in water depths ranging from 800 to 2,000 meters. The reservoir depths range from 2,300 to 2,600m referenced to sea level. ABL reservoirs are high quality siliciclastic turbidite reservoirs from the Tertiary (Miocene sandstones) (Ref. 1). The average gravity of oil ranges from 16.5 to 21.5° API.

A consortium was formed by PETROBRAS and REPSOL in order to develop the field. PETROBRAS is the operator and holds 90% of working interest, while REPSOL holds 10%.

ABL Field was discovered in 1986. The challenging field environment – deep water, low API oil, highly friable sandstones with net reservoir thicknesses ranging from 5 to 35 meters, low fracture gradients – slowed field development, since it would be supported only by emerging technologies at that time, such as long horizontal and gravel-packed wells. Drilling of the development wells only started in 2002 and the last development well will be completed in September 2006. In the first quarter of 2006, the first well will start production. P-50, an 180,000 bbl/day oil capacity FPSO, will collect the production from the field. The production peak will be reached by the end of 2006, when all production wells will be on stream.

The success of an offshore oil field development depends strongly upon the success in drilling and completion the wells. Historically, the well development is the project phase that presents the highest deviations in cost and schedule, due to the geological risks associated and the complexity involved in each operation (Ref. 2). The well team of Albacora Leste used the best management techniques and state-of-the-art drilling and completion technologies, allowing the completion of the well campaign on schedule and on budget.

### The Challenges

The well construction activities, performed offshore in deep waters, require steady alert related to the practices and procedures to be used for excellence in Health, Safety and Environment Management. The Well Construction Team takes this drive as the most important one in the project, according to the guidelines presented by PETROBRAS in its HSE program (Ref. 3).

The drilling of horizontal wells in poorly consolidated sands and in deep water environment has no longer been a problem for the industry. But, the geological characteristics of ABL Field, which reservoir horizon nears parallel to mud line, a