

IPTC 12002

Methodology For Exploratory Offshore Wells Design And Construction, Plataforma Deltana –Venezuela Study Case

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This paper was prepared for presentation at the International Petroleum Technology Conference held in Kuala Lumpur, Malaysia, 3–5 December 2008.

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Summary

The object of this project is the development of a planning model for the construction of off-shore exploratory wells. The starting phase of the investigation comprised the assessment of seismic and geological information, drilling program, weather and oceanographic conditions in off-shore region of eastern Venezuela.

The approach to this work included both technical and logistic aspects in terms of off-shore drilling. The analysis included the evaluation of the geopressure curves (pore and breakdown pressures), casing design, cementing and drilling fluid design. In addition, software-based modelling was performed to enable the optimization of the well-string design and, finally, a time and cost analysis was carried out. The model was mainly applied to a well of year 2.003.

Once the area was characterized and following the planning model for the construction of off-shore exploratory wells derived from the previous analysis and/or study, the methodology was put into effect in the planning of well 1X. In general terms, the basin of the Delta Platform is an area of great tectonic complexity, active and with marked problems associated to overpressurized deposits and a presence of shallow gas.

Introduction

This project is intended to present an approach based on the planning of an off-shore well, taking as a reference the experience acquired during the construction of exploratory wells drilled in the area; considerations for this purpose were given to the results obtained on these wells, in terms of pore and breakdown pressure, setting depth, well trajectory, design of the drilling fluid, cementing, bottom assembly, casing, integrity test and lithologies. Finally, all information relevant to the planning and execution of the work was collected in an optimal manner.

At present, the planning of inland wells is availed with sufficient information and software packages to support the specialist in the preparation of a construction plan; however, in terms of off-shore wells, there was no availability of software in support of the drilling operation; for which reason, drilling manuals from other countries, such as Mexico, Trinidad & Tobago, which have considerable off-shore drilling experience, have been used.

In the planning of a well, attention shall be focused on the following elements and their costs: location, choice of the drilling unit, water depth, environmental conditions, features of the seabed, geological and geophysical data and well design (depth and trajectory to be drilled), among others. Considering all of the above variables, the interdisciplinary team planning the construction of a well shall propose a suitable and duly supported working approach so that the quality of the expected product (the exploratory well) is achieved with a high level of cost efficiency by selecting the most adequate technology, the most appropriate materials and the companies and services that offer the highest level to assure the relation cost-profit-quality for the promoter.