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## AKPO: A Giant Deep Offshore Development

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### ABSTRACT

Since TOTAL Girassol in Angola, the world first deep water project ever, deep offshore developments have become more common place but all of them had and have their own particulars and challenges. They all are large developments, difficult to implement and often beyond the limits of proven technologies at their inception.

Akpo field is located in OML 130, 200 km offshore Nigeria in 1400 m water depth. At plateau production, Akpo will produce and export 175,000 bbls/day of condensate and will export at start up 320 mmscfd of gas to Bonny NLNG plant, onshore Nigeria.

Akpo reservoirs characteristics have greatly influenced the development scheme while still making it technically and economically viable. Akpo reservoirs consist in a 620 million recoverable barrels accumulation of a critical fluid made of very light oils ( $^{\circ}\text{API}$  up to 53) classified as condensate, with well head shut-in pressures up to 400 bars, fluid temperature up to 116  $^{\circ}\text{C}$  at wellhead and very high GLR (Gas Liquid Ratio). AKPO is not only a giant condensate field, but also a gas field with 1Tcf planned gas export.

With such reservoir conditions, the development is in a league of its own. Nevertheless, the Akpo development scheme maximizes the use of proven and generic technologies when ever possible.

The development is taking place at a time when the supplier market is very buoyant. This, in turn, has created additional challenges with respect to the availability of skilled resources and obtaining quality products on time.

The paper addresses the challenges of AKPO development and in particular some of the key technical issues.

A unique hybrid condensate production/gas export development scheme which maximises hydrocarbon recovery

Reservoir management requiring massive pressure maintenance facilities, extensive use of intelligent and selective completions and subsea multiphase flow measurements

A development drilling strategy and well architecture

A subsea layout compromise, aiming at maximum reliability and availability

Extensive qualification and testing program of equipment to meet with the reservoir conditions

An FPSO concept pushed to the limits to handle high volume of high pressure fluids together with a very large gas inventory

The securing of resources in terms of dry dock slot, marine spread and deep offshore drilling units in a buoyant market

TOTAL, with 24% interest, is the operator on OML 130 on behalf of Petrobras of Brazil, Sapetro of Nigeria, CNOOC of China and NNPC of Nigeria.

Akpo achieved Project sanction on 25<sup>th</sup> April, 2005 when OML 130 was awarded by the Nigerian authorities. Akpo is currently under development with drilling and construction underway with first production planned before the end of 2008.

### AKPO DEVELOPMENT

AKPO development is be the first TOTAL deep water operated production in Nigeria.

Although, deep water operations have become more common in recent years they remain complex and challenging. We drill in water deeps ranging from 1300 to 1440m across the block and in areas where the subsurface geology tests our drilling and completions capabilities.