



OTC 19941

Pigging Operation of Single Production Lines in Deepwater Fields

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This paper was prepared for presentation at the 2009 Offshore Technology Conference held in Houston, Texas, USA, 4–7 May 2009.

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Abstract

In West Africa, several newly discovered deepwater fields have an estimated oil recovery that is not large enough for independent hub development. The exploitation of these marginal fields is performed via tie backs to an existing host which could be located tens of kilometres away. To optimise the cost of the field development, the classical subsea production loop arrangement developed for the giant fields has to be challenged. Providing one Single Production Line to gather the flow of the remote production wells reduces the investment cost of a tie back, even if the operability of this concept remains a challenge.

Pigging operation is one example of the operability issues of a Single Production Line. Contrarily to pigging of classical loops or to common commissioning operation, deepwater pigging operation of Single Production Lines is not yet mature in deepwater, because of the lack of back up solutions for several potential problems: stuck pigs, immature subsea pig launching technologies, complex subsea equipment, low pressure wells...

As part of a general effort to improve oil development in offshore Angola, the Angola Deepwater Consortium (ADC) was formed in 2000 by Sonangol with industrial partners Doris Engineering and Pride Foramer. Under the guidance of a JIP Steering Committee composed of representatives and experts of BP, CABGOC, Esso Exploration Angola (Block 15) Limited and Total E&P Angola, ADC has investigated the feasibility and the main impacts of pigging operations of Single Production Lines in deepwater. Several alternatives of architecture, such as service line hybrid loops or electrically heated production lines equipped with temporary pig stations, have been studied and compared.

The purpose of this paper is to present the pigging operations of Single Production Lines, focusing on the main objectives and on the specific concerns.

Introduction

As part of a general effort to improve oil development in offshore Angola, the Angola Deepwater Consortium (ADC) was formed in 2000 by Sonangol with industrial partners Doris Engineering and Pride Foramer. ADC has investigated the different concepts of Single Production Lines applicable to marginal fields to optimise the cost of the field development. Several alternatives of architecture, such as service line hybrid loops or electrically heated production lines have been studied and compared. Two main concepts have been identified as frontrunners for deepwater marginal fields. Operability issues related to pigging operation in deepwater have then been addressed and design issues for selected Single Production Lines have been highlighted.

The study reported in this paper was carried out by Angola Deepwater Consortium (ADC) under the guidance of a JIP Steering Committee composed of representatives and experts of BP, CABGOC, Esso Exploration Angola (Block 15) Limited and Total E&P Angola. ADC was encouraged to draw on the experience of these companies on the subject and to consult the reports and studies carried out by the individual companies. The final report and this paper is the view of ADC on the subject, as reported back to the Participants. ADC would like to thank the companies and individuals for their efforts, contributions and the permission to publish this paper on the study, which was completed in December 2008.