When High Oil Prices Push Fast Track Subsea Developments: The Total Forvie North Project pipe-in-pipe experience

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ABSTRACT

With the rise of oil prices, clients are willing to accelerate all field development phases. There is then a natural temptation to choose field-proven solutions that have demonstrated their efficiency and quality in the past.

For the Forvie project, TOTAL needed a design capable to handle high operating pressures (520 bar) while providing outstanding thermal performance (U-value better than 0.8W/m².K). Another key issue for the oil companies (operators) is to open the pipelay competition and increase the chances to find an available vessel.

To answer this acute scope of work, a pipe-in-pipe flowline system was selected, combining an original quick field jointing procedure (6 minutes cycle time) with a highly efficient passive insulation (based on a proprietary insulation and offering a compact design). Due to the field-proven technique (with an actual thermal performance world record of 0.35W/m².K) and the capacity to mobilize a fabrication yard, ITP was awarded the contract including the engineering, procurement, fabrication and offshore assistance to installation.

One year later, the last double joint of the 33km long pipe-in-pipe tie-back was S-laid in the North Sea on time and the field has been onstream since December 2005.

The paper will address issues such as the tight planning (1 year from contract award up to offshore installation completion), logistics, welding (double joints with a heavy wall inner pipe), the fabrication process and the offshore installation phase.

KEY WORDS: pipeline; pipe-in-pipe, insulation, fast track, S-lay

INTRODUCTION

When TOTAL decided early 2004 to develop its Forvie North field located in the UK North Sea (see Figure 1), with the challenging objective of first oil by the end of 2005, the project team was confronted with an incredibly ambitious schedule at a time of shortages of key resources in the oil and gas industry. To meet the target, a specific contractual approach was selected in order to be able to make technical choices that contributed to meeting the overall schedule. The Forvie North field first oil was produced on 29 December 2005.

Fig 1: The Forvie North Field development. The Pipe-in-Pipe system goes from the Forvie manifold to the Alwyn North platform.

The Forvie North field is located in Block 3/15 of the UK North Sea and is located approximately 16.4 km from the Dunbar platform and 34 km from the North Alwyn ‘B’ Platform (NAB), in a water depth of 120m. Forvie North is a high-pressure gas condensate reservoir, with a