OTC 19115

Extend the Capacity of a Jumbo FPSO: The ROSA Project

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This paper was prepared for presentation at the 2007 Offshore Technology Conference held in Houston, Texas, U.S.A., 30 April–3 May 2007.

Abstract

This paper presents the Technical and Organizational Challenges SOFRESID ENGINEERING have met to extensively engineer the modification and upgrade of GIRASSOL FPSO to accommodate the production of a new oil field : ROSA offshore Angola.

Technical challenges came from the drastic limitation in additional weight, stability and available space of such an existing floating vessel, as well as operational constraints such as reducing shut down time, hook up operation and the need of a complete revamping of the Control and Safety System.

Organizational challenges came from the limitation of lifting and installation means that drove the design optimization, the need of an extensive and accurate knowledge of the as built facilities. They were increased by the overall market situation leading to long procurement lead time and scarcity of Engineering resources.

The main objective of this paper is to describe these challenges and the way SOFRESID ENGINEERING and TOTAL E&P ANGOLA have worked together under a new contracting strategy to overcome them by developing innovative solutions such as an intelligent 3D modeling coupled Laser Survey, continuous module design optimization, advanced lifting frame arrangement, and a proactive multi-center engineering organization.

Introduction

The ROSA field located in block 17 offshore Angola will be developed through the existing Floating Production Storage and Offloading (FPSO) GIRASSOL which needs modifications and additional facilities to accommodate such additional production.

GIRASSOL is the first very large FPSO ever installed:

- Production capacity : 220,000 bod,
- Storage capacity : 2,000,000 barrels,
- Water depth: 1,350 m,
- FPSO size: 300 m x 59 m x 30 m,
- FPSO weight: 350,000 t,
- Topside equipment: 25,000 t dry,
- Gas compression and reinjection at 350 bars (25 MW).

Capacity increase will be significant, with a stream capacity which will jump up to 270,000 bod and water treatment facilities from 180,000 to 300,000 bwd to be injected in the field at 275 bars.

SOFRESID ENGINEERING has been awarded by TOTAL E&P ANGOLA a comprehensive Engineering, Procurement services and ICSS supply contract to engineer the first ever done upgrade of a new built FPSO under operation.

This contract is made of several elements such as Lump Sum for the Supply, Target cost for Engineering services, full Reimbursable for Vendor and Contractor Follow up and several Bonus / Malus clauses forming an innovating incentive scheme regarding Project Cost, Weight and Shutdown time.

During this large Engineering work all provision have been taken for the execution of the project considering that construction, installation, hook up and commissioning on the FPSO will be accomplished in a SIMOPS mode (Simultaneous Operations and construction).