



OTC 18585

Independence Installation

Andrew Couch, Atlantia Offshore; James Guion, Enterprise Products Partners; Douglas Rieth, Atlantia Offshore; Brent Rager, Offserv Engineering; and John Bouwman, Heerema Marine Contractors

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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.

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Abstract

This Session paper will review the planning, preparation, and execution of the installation of the Independence Hub facility in Mississippi Canyon Block 920. The scope of the paper will encompass the transport and installation of the suction piles, the transport of the integrated facility to the offshore installation site and the installation of the polyester moorings and steel catenary risers in record water depths.

The focus of the paper will be to highlight the use of existing technology and some innovative solutions to accomplish the installation of a facility that challenges existing Gulf of Mexico equipment depth and capacity limits. The results will show that the methods employed minimize costs and improve construction and installation efficiency.

The paper will identify the importance of technically sound but simple design concepts and operations plans required for an installation in 8,000 ft of water with specific contributions regarding transportation stability, polyester mooring deployment/construction-stretch removal, and deepwater SCR retrieval and transfer.

Introduction

The Independence Hub gas production platform is installed in Mississippi Canyon Block 920. This ultra-deep facility is owned by Independence Hub, LLC – which is owned 20% by Helix Energy Solutions and 80% by Enterprise Field Services, LLC. The platform serves as a central hub to subsea fields for four anchor producers – Anadarko Petroleum Corporation, Devon Energy Corporation, Hydro Gulf of Mexico, LLC and Dominion Exploration and Production, Inc. The anchor fields (Independence Subsea) are connected back to the facility through producer-owned subsea flowlines and SCRs from fields that range from 7800ft (2377m) to 9000ft (2743m) water depth. Production is delivered from the Independence Hub via a dedicated 20-inch export riser (Independence Trail), the world's deepest export pipeline and SCR.

The following paragraphs focus on the installation of the Independence Hub. Heerema Marine Contractors were contracted to perform the installation of the Independence Hub facility. Their scope comprised three campaigns:

- (1) April/May 2006 - Transportation and installation of the foundation (suction) piles
- (2) January/February 2007 – Transportation of the semi-submersible platform (by Enterprise, handover at site), transportation and deployment of mooring lines, connection of the moorings to the semi-submersible hull
- (3) March/April 2007 – recovery and pull-in of the SCRs, diver installation SCR spool pieces

Although most activities in these campaigns have been performed previously for similar facility installations, specific challenges posed by the size, capacity and configuration of the system components AND the record breaking water depth, required that innovative solutions be employed with existing technology. Lessons-learned and experience from previous operations were also utilized as inputs to design and planning of installation activities. The result was a successful operations campaign, mitigating cost and risk while increasing safety and efficiency for the installation of a record breaking facility.

Facility Description

The Independence Hub platform consists of a semi-submersible hull, with integrated topsides and a 12-line taut polyester mooring system, which support the steel catenary risers (SCRs) from the various production sites and the export facility pipeline (Figure 1).

Hull. The semi-submersible hull is a deep-draft four column hull with an integral ring pontoon designed and constructed by Atlantia Offshore, Ltd (Houston, Texas). The hull footprint is 232ft x 232ft (70.71m x 70.71m) by 160ft (48.77m) high. The columns measure 46ft x 46ft (14.02m x 14.02m), and the pontoons are 26ft (7.92m) high by 38ft (11.58m) deep. The operating draft is 105ft (32.00m), leaving a freeboard of 55ft (16.76m). The hull provides 19,400ShT (17,600mT) of payload capacity in addition to 13,800ShT (12,520 mT) dry weight or 45,800ShT (41,550 mT) total displacement. The hull is designed to support up to sixteen (16) 10-inch diameter incoming flowlines (some of which will be 8-inch), one 20-inch diameter export pipeline, and twelve (12) production umbilicals. The hull was fabricated at Jurong Shipyard in Singapore from January 2005