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Agbami Field Development: Subsea Installation Contract, Overcoming the Challenges

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Abstract

The subsea installation contract (SIC) for Agbami was awarded by Star Deep Water Petroleum Ltd (an affiliate of Chevron Corporation) to Technip in May 2005. The scope of work included the design, fabrication and installation of nearly 100 km of flexible risers, flowlines and jumpers, and 45 km of static and dynamic umbilicals. It also included the installation of various Star Deep Water provided items including 12 piles and manifolds, 82 electrical flying leads and 51 hydraulic flying leads.

The project is in approximately 1,550m of water and represents one of the world's largest subsea installation contracts awarded.

The key logistical challenges for this very large project were to ensure the safe and timely delivery of the flexible and umbilical products, and the real time coordination of logistics associated with their transportation from Europe to Nigeria using a fleet of five heavy lift transport vessels and installation in the field. Installation had to be coordinated with the FPSO and other subsea contractors working in the field, as well as simultaneous field operations with drilling vessels throughout the installation phase. Additionally, working offshore Nigeria presented its own set of challenges including security and other operational constraints.

Of the technical challenges, the risers are the longest single section of flexibles to have been manufactured and installed to date. Production risers and flowlines may need to transport a mildly sour well fluid in the future, hence control of the permeation of hydrogen sulphide into the annulus was a significant issue that required an innovative design.

This paper will present an overview of the subsea systems employed for the Agbami field and outlines some of the particular challenges that the project team had to respond to, including:

- Flow assurance requirements and the consequent thermal performance required from the system
- The implications of potential sour produced fluid on the design of the flexibles.
- Scheduling of the installation activities around available windows including the early installation of piles, manifolds and static umbilicals
- Successful offshore precommissioning of the production lines and associated control systems which were required for First Oil while continuing to progress the remainder of the installation programme
- Logistics associated with transport of a very large quantity of products from Europe and delivery to Nigeria, along with the need for management of in-country logistical and safety support services
- The constraints imposed by the available crane capacities and how they were resolved

Introduction

The Agbami FEED for the subsea network was first initiated in 1999. During FEED, one of the potential technical solutions to be further considered was based on a fully flexible pipe network which was particularly attractive due to the reasonably