



OTC 17899

## Subsea Boosting of the Brenda Field Through Utilization of a Multipurpose Field Development Solution

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This paper was prepared for presentation at the 2006 Offshore Technology Conference held in Houston, Texas, U.S.A., 1-4 May 2006.

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### Abstract

Subsea multipurpose field development solution has been chosen for the field development scenario of the Brenda and Nicol Fields in the UKCS, operated by OILEXCO North Sea Ltd.

This paper presents an overview of the Brenda and Nicol fields, the system solutions and flexibility selected for the field development and in brief the selection process. The Framo Single pump Station (FSS) forms the basis for a system solution, which is built around the compact MultiManifold for tie-in of individual satellite wells, the multiphase pump for boosting of the unprocessed well streams, the multiphase meter for reservoir management and individual well testing and the control modules for pump station and production system control.

### Introduction

#### Field Description

The Brenda Field is located in UKCS Block 15/25b (License P1042) and UKCS Block 15/25e (License P1157), both owned by OILEXCO North Sea Limited (100%). The field is located approximately 220 km north east of Aberdeen in the U.K. Sector of the Central North Sea, see Figure 1.

The field will be developed via a subsea tie back of 4 horizontal wells to the CNR International (UK) Limited operated Balmoral Floating Production Vessel ("FPV"), 8,5 kilometers to the North East. First oil is scheduled for Q4 2006.

The Nicol field located in UKCS Block 15/25a is owned by OILEXCO North Sea Ltd., ConocoPhillips and ENI. The field

with one production well will be tied back to the Brenda subsea production manifold. See figure 2.

### Overall System Description

The system comprises a subsea production manifold based on the Framo Single pump Station (FSS), see Figure 3. For the Brenda field, the FSS will be arranged to route five wells to topside from day one. Four wells are located near by the FSS while one is a satellite well located approximately 10 km from the production manifold. The manifold arrangement has a possibility of eight wells to be routed through the FSS, which gives a spare capacity for three future well tie-ins.

The design provides the possibility to apply gas lift on each of the wells. The gas lift flow rate will be based on a choke setting due to VenturiMeter readings. Pressure and temperature transmitters are installed near the VenturiMeter to improve the accuracy of the readings. ROV operated isolation valves for each gas lift system are provided. Gas lift will mainly be used to kick off the wells and to enable production at high water cuts.

Each production well will be routed to a Multiport Selector Manifold (MSM) located on the manifold. The MSM gives the opportunity to route one well at a time through a test line with a Multiphase Flow Meter (MPFM) and a sand detector installed. The MPFM hence allows for individual well testing.

A production choke and diver/ROV operated isolation valve is provided for each well on the manifold. The crude oil can either be boosted by a MultiPhase Pump (MPP) installed on the manifold or be routed directly to the flowline through a bypass check valve. The MPP can be isolated by an actuated inlet valve and an ROV operated outlet valve. A check valve down-stream the MPP avoids backflow through the pump.

A tailor made control system, with tree retrievable control modules, is installed on the FSS, for pump station and production system control.

A power and control umbilical will be installed between the Brenda manifold and the platform. The power and control umbilical will provide high voltage electric power to the multiphase pump, as well as small power, signals, hydraulic fluid and chemicals to operate and control the pump station.