

Start-up and Operation of the Ormen Lange Flowlines

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ABSTRACT

The Ormen Lange Field was successfully brought into production in September 2007. Ormen Lange represents one of the most challenging deep-sea environments of any subsea gas development in operation in the world today. A combination of irregular seabed topography with steep inclines and sub-zero deep water temperatures make operation of the Ormen Lange flowlines a challenge in terms of liquid management and hydrate inhibition.

This paper describes the method by which the Ormen Lange flowlines were brought into operation, the challenges faced and the technical findings. The ongoing steady state operation of the flowlines is also described, and comparison is made between expected responses simulated during the design phase, and actual performance in the field.

KEY WORDS: Subsea, Pipelines, Deepwater, Flow Assurance, Hydrate Inhibition, Operation

INTRODUCTION

Ormen Lange Field

The Ormen Lange Field is located 120km off the west coast of Norway in the Norwegian Sea. Ormen Lange will deliver volumes equivalent to 20% of the UK gas supply in peak production. This represents a nameplate capacity of 70Msm³ gas per day (peak) and up to 8000m³ per day of associated condensate. First gas from Ormen Lange was achieved on 13th September 2007.

The Ormen Lange reservoir was discovered by Hydro in 1997 and is located approximately 3000m below sea level. The total recoverable reserves are estimated to be 400 billion Sm³ dry gas and 30 million m³ condensate. Ormen Lange has been developed as a subsea to beach concept, with the subsea systems located in a water depth of 850m in the prehistoric Storegga Slide area. Up to 24 wells will be tied back to

shore via two 30" production flowlines to the Nyhamna terminal on the west coast of Norway.



Figure 1. Location of the Ormen Lange Field

At Nyhamna the gas is dried, dewpointed and compressed, and then exported via the 1200km 42" Langede pipeline to Easington on the east coast of England. Langede is the longest subsea gas export pipeline in operation in the world today. The condensate is stabilized and shipped directly from Nyhamna.

Hydro was the operator of Ormen Lange for the field development phase. Norske Shell took over operatorship from StatoilHydro in December 2007 and is now responsible for the operation of Ormen Lange Phase I and the development and installation of Ormen Lange Phase II facilities. During the commissioning and start-up period Shell operations worked as an integrated part of Hydro's Project team.