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Ormen Lange Subsea Compression Pilot — Subsea Compression Station

Håkon Skofteland, Mike Hilditch, Truls Normann, Klas Gøran Eriksson, Knut Nyborg / Aker Solutions;
Michel Postic / Converteam, Massimo Camatti / GE Oil&Gas

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Abstract

Aker Solutions is the main contractor for the engineering, procurement, construction and installation of the subsea compressor station being built as part of the Ormen Lange pilot project. The compression station pilot is a full scale 12.5 MW compressor train which is equal to one of the four trains required for the permanent subsea compression station for the Ormen Lange gas field.

This paper describes the system design, equipment and subsea technology developed for the compression station pilot. The main part of the project has been to design equipment and technology fit for installation at 900 meters water depth and to ensure that the stringent requirements for reliability and robustness are fulfilled.

The process system is exposed directly to the wellstream at Ormen Lange and is designed to handle varying gas-condensate rates, liquid slugs and sand production. The main process equipment is the separator, compressor, pump and cooler. The high voltage power distribution system includes subsea circuit breakers, subsea transformers and frequency converters to drive the subsea compressor and pump. The electrical equipment is included in subsea enclosures with high voltage mating mechanisms between the units.

The control system is key component for the subsea compression station. The long tie-back of 120 km and the requirement for high speed closed loop control and high bandwidth communication to shore initiated development of new technology solutions. An all electrical control system is developed with subsea uninterruptible power supply and electrical actuators. A SIL2 rated Process Shut-Down System (PSD) is also included for additional protection of the subsea components. Communication subsea to shore is via fibre optic lines in the power umbilical.

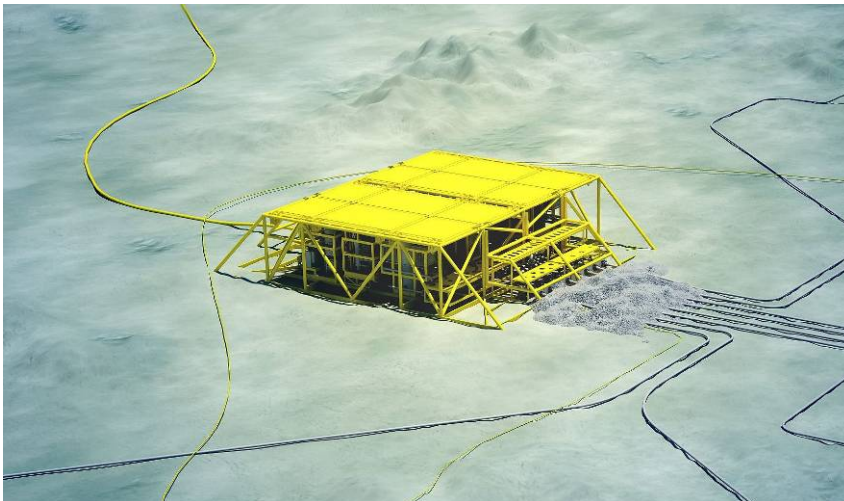


Figure 1: Ormen Lange subsea compression station