



Integrated Operations

# Process Control Commissioning at Ormen Lange

# Development of Ormen Lange

Faster commissioning, reduced downtime and improved energy efficiency have been the results of process control performance services carried out at the plant serving Ormen Lange, the largest natural gas field in development on the Norwegian continental shelf. The services were carried out alongside commissioning by a team from ABB's Integrated Operations department.

The Ormen Lange gas field is located in the North Atlantic, 120 km northwest of Kristiansund, where the depth varies between 800 and 1,100 meters. The reservoir is 3,000 meters below sea level, covering an area 40 km long and 8-10 km wide. The field does not feature any conventional offshore platforms. Instead, 16 subsea wellheads on the ocean floor are connected directly by two 30 inch, 120 km long pipelines to the onshore process terminal at Nyhamna.



The wellheads on the ocean floor are connected to the onshore process terminal at Nyhamna.

Process control optimization of the onshore plant was carried out alongside commissioning.



The gas from Ormen Lange is blended with gas from other fields at the Sleipner platform in the North Sea and transported to Easington in the UK via the 1,155 km Langedled pipeline, the world's longest subsea export pipeline. The Ormen Lange field can supply 20% of the UK's demand for gas.

The field was discovered in 1997 by Norsk Hydro's oil and gas division, which has since become part of Statoil. Following the start of production in September 2007, responsibility for operation was handed over to Norske Shell.

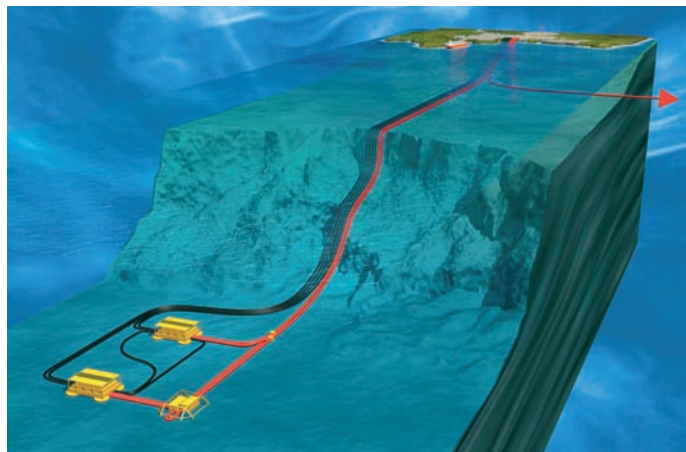
### Norway's biggest project ever

The development of the field has been the largest single project in Norwegian industrial history. ABB supplied automation, electrification, telecommunications and operator training systems. A comprehensive automation, safety and information management system oversees all applications for operation, maintenance, planning and reporting, using a distributed control system with 15,000 I/Os. The engineering contractor for the facility was Aker Solutions.

Process control services, covering services to speed up commissioning of the control logic, as well as increase the uptime and efficiency of the equipment, was an additional order placed by Norske Shell while planning the start of operations, in the summer of 2007. The project was to run in tandem with commissioning of the automation system, aiming to adapt the control logic and its parameters to the actual production situation in an efficient way.

The result has been faster commissioning and start-up. The project has also increased uptime by four to five days per year, which represents a significant increase in revenues, bearing in mind that the field produces 70 million standard cubic meters of gas per day. In addition, energy efficiency has improved. The work also enabled Shell to learn about the system more quickly, helping the company to use the equipment in the most effective way.

The work was carried out by a team specializing in process and production optimization from Integrated Operations, a department within ABB that delivers solutions and services for more profitable operations and improved work processes. The value of the optimization project has been 25 million NOK up to 2010, an amount quickly recouped by Norske Shell through more rapid start-up and increased uptime. The contract was originally for three years but was extended by another two years in 2010.



The wellheads, 800 to 1,100 metres below sea level, are connected directly to the onshore terminal; the reservoir itself is 3,000 metres below sea level.

### Extracting gas and condensate

An anti-freeze fluid, monoethylene glycol (MEG), is added to the natural gas at the wellheads at a depth of 800 to 1,100 m before the gas flows to the pipelines. The gas is then brought ashore in the pipelines, across a distance of 120 km. On arrival at the Nyhamna facility, the gas is led into slugcatchers to separate out condensate, anti-freeze fluid, water and solids from the gas.

Residual water and condensate is removed from the gas using triethylene glycol (TEG) in two parallel trains of TEG contactors. The gas is then compressed in three parallel compression trains and transported by pipeline, via the Sleipner field in the North Sea, to the UK.

Any gas that remains in the condensate after separation is removed in a stripper before the condensate is led to a storage cavern to await shipping. The anti-freeze fluid is dried and cleaned in a regeneration system and returned to the wellheads for reuse.

The whole process from the wellheads to the processing facility and the onward transport to Sleipner is monitored and controlled from the operations centre at Nyhamna.

**Detta är endast ett utdrag. Kontakta mig om du vill läsa dokumentet i sin helhet.**

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