ABB High Voltage Cables

Complete power-from-shore electrical drive system
Troll A 3&4 Pre-compression project, North Sea

– Complete ABB electrical drive system including HVDC and HVAC cable systems
– Experienced and ‘big name’ EPC
– No production losses and zero harm to people and the environment

Scope of supply
– Complete ABB electrical drive system to power two offshore gas compressors
  - HVDC Light® and HVAC cable systems
  - HVDC Light offshore and onshore converter stations
  - Very high voltage synchronous motors
– Cable system design and engineering
– Cable system qualification testing and fabrication

Cable data
Voltage 72kV AC, ± 80 kV DC; 2x40 MW
Route length 69 km AC; 2 x 2 x 70 km DC
Water depth 350 m
Completion 2015

Norway’s largest natural gas field
Troll A is one of the largest natural gas and oil fields in the North Sea. It holds around 50 percent of the remaining gas reserves in the Norwegian continental shelf. With pressure in the reservoir decreasing, Statoil is installing two additional gas compressors (3 and 4) to accelerate production and enable gas to be produced as the wellhead pressure decreases. The compressors will come on stream in 2015, and will extend the productive life of the field to 2063.

World’s first DC power-from-shore installation
In 2005 ABB provided Troll A’s first two compressors (1 and 2) with a truly revolutionary solution. It consisted of an electrical drive system comprising two groundbreaking ABB technologies: the world’s first high voltage direct current (HVDC) power-from-shore connection to an offshore oil and gas platform, and the world’s first commercial installation of two very high voltage synchronous motors, each with a power rating of 40 MW. The 2005 HVDC Light power-from-shore solution converts AC power from the 132 kV mainland power grid to DC at a HVDC Light converter station at Statoil’s Kollsnes gas processing plant. Two HVDC Light power cables, each with a capacity of 40 MW, transport the power at 60 kV DC to the Troll A platform, a distance of 70 kilometers. There, the power is reconverted to AC in a compact lightweight converter station module and fed to the two ABB very high voltage synchronous motors, which power gas compressors 1 and 2.

The benefits of the ABB solution compared to the conventional method of installing gas turbines to generate power on the platform include: significantly lower installation, operating and maintenance costs, and the elimination of around 230,000 tons of CO2 emissions a year.
The second ABB HVDC and HVAC solution

Following the huge success of the first ABB electrical drive solution, Statoil again selected ABB in 2011 to deliver a similar solution for compressors 3 and 4. Appointed by Statoil as the engineering, procurement and construction (EPC) contractor for the electrical drive system, ABB is delivering a HVDC Light cable system, onshore and offshore converter stations, and two very high voltage synchronous motors with power ratings of 44 MW and 50 MW. Like the 2005 installation, the solution will convert AC power to DC in a new onshore converter station and transport it via two HVDC Light cables to a new converter station module on the Troll A platform. The cable system will deliver 80 MW of power at 60 kV. In a separate contract, Statoil has also selected ABB to provide a 72 kV HVAC cable system with integrated fiber optics. The 70-kilometer cable will deliver additional AC power to the platform from the mainland transmission grid.

Why ABB?

Statoil required an experienced and ‘big name’ EPC contractor who could provide a complete electrical drive system and fulfill Statoil’s meticulous requirements for project execution. These require ABB to successfully execute the project with zero harm to people and the environment and without incurring production losses at Troll A and Kollsnes.

The Troll A electrical drive systems are just two of many projects that Statoil and ABB have collaborated on, several of which have involved high voltage AC and DC power cables. In 2010, for instance, ABB developed the world’s first power-from-shore dynamic AC cable for Statoil’s Gjøa floating oil and gas platform in the North Sea.

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