

Submarine Cable Link

Powering Abu Safah offshore oil-field in Saudi Arabia



Cable data power cables

Voltage	115 kV AC
Power	100 MVA
Insulation	XLPE
Length	50 km
Conductor	3 x 1000 kcmil (507 mm ²) Cu
Weight	84 kg/m
Customer	Saudi Aramco
Year	2003-2004

Project content

- XLPE cable and accessories
- Cable system design
- Cable route survey
- Installation (onshore and offshore)
- Testing
- Project management

History

When the world's biggest oil company Saudi Aramco, wanted to increase the production at Abu Safah oil field in the Arabian Gulf they needed more power to the platforms. They saw two alternatives - either to install extra diesel generators on the platforms or to connect the platforms to the power grid on mainland Saudi Arabia. Considering environmental aspects as well as maintenance cost Saudi Aramco decided to install a 50 kilometers-long submarine AC power cable to the oilfield.

Scope

ABB manufactured, delivered and installed the polymeric insulated (XLPE – cross linked polyethylene) submarine 115 kV cable. The scope also included survey of cable routes, on-shore works such as building a transition yard, trenching and cable laying, cable burial at shore approach, cable crossings and tie-backs, terminations and splicing, provision of repair materials, final testing and commissioning.

The cable system

Power from the Saudi Arabian network is transmitted to a distribution platform in the Abu Safah Oil Field via a 115 kV cable. This submarine cable was supplied in one continuous length of 50 km and 4,550 tons and it is the biggest and longest submarine power cable of its kind (XLPE) ever manufactured and installed by ABB.

The cable has 3 x 1000 kcmil copper conductor with an XLPE insulation of 20,3 mm thickness. In addition to a lead sheath, protected by a PE jacket, both the conductor and the core are water-sealed. Before the three cores are assembled, they are

joined by moulded joints, with features identical to the cable itself.

This makes it possible to armour the cable in one single length with 6 mm galvanised steel wires. The armour will protect the cable from being damaged by dragging anchors or rocky bottoms. The outer serving of the submarine cable consists of bitumen-bonded polypropylene yarn.

Route

The distance from the east coast of Saudi Arabia to the distribution platform in the Arabian Gulf is 50 km. Five offshore oil platforms are connected via 70 km 15 kV cables.

Installation

Installation of submarine cables in this area could be rather difficult. The laying was a precision job, since it must be installed in a producing oilfield in the path of heavy oil tankers. The submarine cable was laid in 33 meter deep water and runs from an overhead/ underground transition yard to an offshore tie-in platform approximately 50 kms from the shore. Spare cable + surplus cable was laid on the seabottom next to the cable route for easy retrieval and to avoid the need for a large space consuming storage turntable near the coast onshore. The installation was completed in two months time.

Commissioning

By July 2004 the cable had been successfully laid and installed and commissioning tests were successfully performed. The entire cable system was timely handed over to the client for commercial operation in December 2004. With this project ABB once again proved its capability to design and install complex cable systems and to achieve environmentally sound solutions for our clients.

ABB has a long experience and a successful history of XLPE insulated power cables. As early as 1973 ABB installed an 84 kV XLPE submarine cable between Sweden and the Finnish island of Åland. This cable has served its purpose very well and during all years no electrical failure has occurred.

