

CASE STUDY

BORLINK™ LS4201S SUPPORTING SUBMARINE CABLE POWER TRANSMISSION FOR OFFSHORE OIL FIELDS IN BOHAI BAY, CHINA



Submarine cables for power transmission to oil fields in Bohai Bay. (Photo courtesy of Ningbo Orient)

BACKGROUND

Located close to Beijing and Tianjin, Bohai Bay is the most important crude oil production area for the China National Offshore Oil Corporation (CNOOC), reaching 477,374 BOE/day as of the end of 2020¹.

Within Bohai Bay lies the Qinhuangdao/Caofeidian onshore project supplying power to offshore oil platforms. This project helps to ensure power reliability and stability of offshore operations, thus reducing dependence on imported generators. The project is also expected to reduce carbon dioxide emissions by an average of 170,000 tonnes per year, enabling higher energy conservation and better control of energy costs.

Two onshore switch stations will transmit power to the joint well near a submarine cable landing point, and then through the submarine cable transmitting power to two 220kV electric power platforms in the Qinhuangdao 32-6 and Caofeidian 11-1 areas, supplying power to offshore platforms in the entire Bohai oil field area.

CHALLENGES

Ningbo Orient Wires & Cables Co., Ltd was appointed to design, manufacture and install two 220kV, 630mm² submarine cables for the Caofeidian 11-1 section.

However, the project posed challenges such as:

- Landing site near the sea and beach had varying elevation levels of 3.6m-5.9m while surrounded by areas used for aquaculture farming and industrial purposes
- Surface soil at landing site had high shear resistance, increasing operational challenges during construction

¹ <https://www.cnooc ltd.com/col/col7311/index.html>

SOLUTION

Having worked with Borouge and Borealis on strategic national offshore wind projects in China, Ningbo Orient selected the cable insulation grade Borlink™ LS4201S and semiconductor grades Borlink™ LE0500 and LE0592S from Borouge and Borealis to meet the challenging demands of the project.

The project has a transmission capacity of 200MW and is the first large-scale implementation of electric energy substitution in an offshore oil field in China. It is also the highest AC transmission voltage and largest onshore power project for an oil field nationwide.

Ideal for insulation in complex applications such as submarine cables, Borlink™ LS4201S is specially tailored for high stress high voltage applications with rated voltage of up to 230kV, and can perform at a maximum operating stress of 10kV/mm.

Produced with our unique Supercure technology under stringent cleanliness requirements, Borlink™ LS4201S offers XLPE cable producers the benefits of design flexibility, superior scorch security and a low degassing burden. This enables the production of compact cables with reduced insulation thickness and at extensive lengths without factory joints.

With lower risks of insulation defects and reduced degassing time, Borlink™ LS4201S enabled Ningbo Orient to optimise their production cycle and produce the 220kV submarine cable at a length of 43km with only one single joint.

Chief Engineer of Submarine Cable Manufacturing Centre, Ningbo Orient Wires & Cables Co., Ltd, Mrs Zhen Lin said, "Bohai Bay contains China's largest offshore oil and gas production area and is part of a nationally important economic zone. Thus, we rely on trusted partners such as Borouge and Borealis in projects like this, because of their excellent track record in delivering safe and reliable cable solutions that meet the demands of rigorous power transmission at high quality standards."

SUMMARY

Project name	Bohai Bay onshore power project
Project location	Qinhuangdao 32-6; Caofeidian 11-1
Project owner	China National Offshore Oil Corporation (CNOOC)
Installation date	April 2021
Producer	Ningbo Orient Cable Co., Ltd
Application	HVAC Submarine Cable
Project requirements	Onshore power supply to offshore oil fields
Solution	Borlink™ LS4201S, Borlink™ LE0592S and Borlink™ LE0500
Solution benefits	• Excellent scorch resistance performance • Low degassing burden • Produced under stringent cleanliness requirements to ensure quality consistency • High extrusion output • Proven track record in submarine cable applications

About Borouge and Borealis Borealis is a leading provider of innovative solutions in the fields of polyolefins, base chemicals and fertilizers. With its head office in Vienna, Austria, the company currently has around 6,900 employees and operates in over 120 countries. Borealis generated EUR 6.8 billion in sales revenue and a net profit of EUR 589 million in 2020. OMV owns 75% of the company and through its holding company, Mubadala owns the remaining 25%. Borealis provides services and products to customers around the world in collaboration with Borouge, a joint venture with the Abu Dhabi National Oil Company (ADNOC). Borealis and Borouge aim to proactively benefit society by taking on real societal challenges and offering real solutions. Both companies are committed to the principles of Responsible Care®, an initiative to improve safety performance within the chemical industry, and work to solve the world's water and sanitation challenges through product innovation and their Water for the World programme.

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