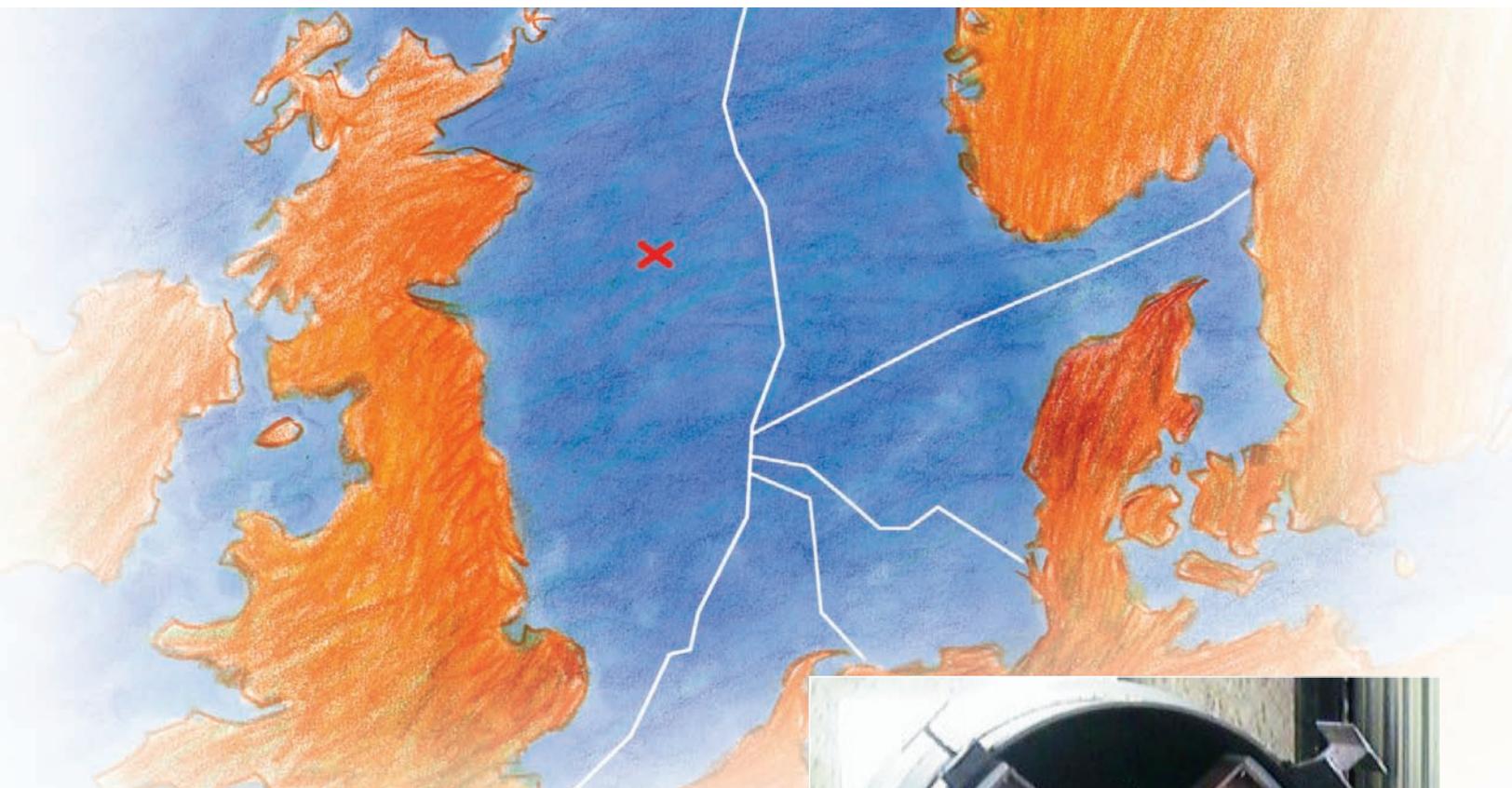


Elgin Franklin interfield pipeline bundle, The North Sea



Project description:

In November 1998, LOGSTOR Oil & Gas signed a contract for a pre-insulated pipe-in-pipe pipeline system using polyurethane foam. The project was The Elgin Franklin Interfield Pipeline Bundle in the British sector of the North Sea.

The subsea pipeline bundle of 5.4 km overall length connects the fields of Elgin and Franklin at a water depth of 92 metres.

The operator is Elf Exploration UK PLC. The EPIC contractor is a joint venture between Smit Land & Marine Engineering Ltd. (SLME), UK, and Coflexip Stena Offshore Ltd., UK. J. P. Kenny Ltd., UK, was employed by SLME as the engineering company.

Temperature of the fluid in the pipeline bundle is max. 160°C and the maximum allowable operating pressure is 150 bar.

The overall U-value requirement for the pipe-in-pipe elements was 1.0 W/m²K (0.176 BTU/ft² hr °F).

Pipe-in-pipe elements:

The pipe-in-pipe elements consist of an OD 12"/314.4 mm, wt. 12.7 mm inner steel flowline with an inconnel liner of 3 mm and an OD 17"/428.5 mm wt. 8.7 mm API 5L X52. Both inner flowlines and outer steel sleeve pipes were freely issued by SLME.

The flowlines were manufactured by Butting, Germany, and the outer sleeve pipes were manufactured by Corinth Pipeworks, Greece. All pipes were shipped to LOGSTOR's manufacturing facilities in Denmark.

All pipe-in-pipe elements were manufactured as single 12 m pipe lengths and delivered to SLME's bundle fabrication site in Tain, Scotland.

[We document the difference]

Pipe-in-pipe insulation process



Insulation:

The polyurethane foam was injected into the cavity between the inner and outer steel pipe with a nominal core density of 110 kg/m³.

The foam has been extensively tested at temperatures up to 188°C to qualify its use at 160°C.

Sleeve pipe field joints:

The sleeve field joint consisted of two welded steel half shells. In order to maintain continuous and fast installation of the flowlines, there were strict demands on free-end tolerances and centre line deviation between the two pipes.

The field joints were insulated on SLME bundle fabrication base using mineral wool mats prior to installation of the welded half shells.

As protection to the mineral wool mats a backing strip was welded on the outer steel pipe.

Supply details:

Manufacturing time at LOGSTOR's plant was 5 weeks in total, based on 5 days per week.

All pipes were stocked at our yard before load out and transportation to Tain, Scotland. The pipes were delivered on time.

Installation:

SLME installed the bundle pipeline by a controlled depth towing method in May 1999.

Contact Persons:

Contractor: Smit Land & Marine Engineering Ltd.
Port Causeway Bronborough
Merseyside L62 4TG, UK.
Phone: +44 151 641 5600
Fax: +44 151 641 5651



[We document the difference]