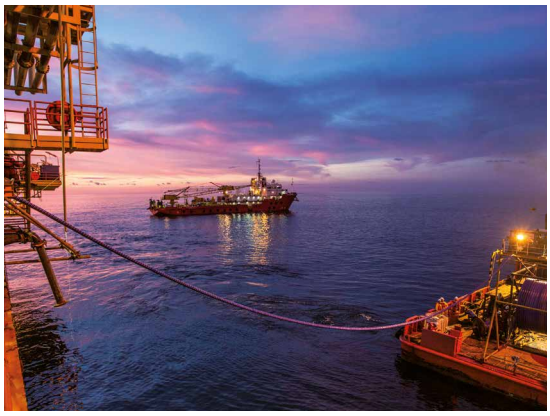
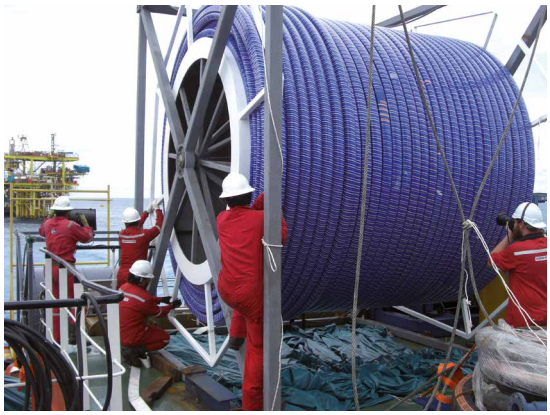
PRIMUS LINE

Job Report





Offshore crude oil and gas pipeline rehabilitation for Petronas

Client:
Petronas

Year of construction:
September 2013

Type of Project:
Rehabilitation of one offshore oil pipeline and one offshore gas pipeline

Our Services:
Manufacturing and delivery of the flexible InField Liner (IFL™)

Task:
In 2011, Raedlinger Primus Line was approached by the corrosion specialist APS Dubai to join hands for the development of a state-of-the-art solution for the renovation of offshore crude oil pipelines for their client Petronas. Since offshore pipelines operate in highly corrosive environments, significant capital investments for the replacement and maintenance of these pipelines are required. Therefore, Raedlinger Primus Line was approached to develop an economical solution that manoeuvers around bends, permits long insertion lengths, has an excellent hydrocarbon and chemical resistance, is characterized by a high performance corrosion resistant barrier and accommodates temperatures of over 80° C. In addition, the system should show extremely low permeability, be easily transportable and can be installed quickly while having little equipment requirements on site at the same time.

Technical Details:

Host Pipe Material:	Carbon steel
Transported Medium:	Gas lift, crude oil
Host Pipe Diameter:	6 inch (gas), 8 inch (crude oil)
Operating Pressure:	60 bar (gas), 6 bar (crude oil)
Deployed system:	IFL™ 8 inch IFL™ 6 inch
Total Length:	two sections with 1,400 m each
Bends:	(3) 90 degree bends, 5 x D
Number of Construction Sections:	1 installation section each
Installation Time:	3 days per section

Rehabilitation System:

For this unique and challenging project the IFL™ technology was developed. This solution is based on the proven Primus Line® system which can be used for the rehabilitation of pressure pipes. To fulfill the unique requirements of offshore pipeline operators, the inner layer of the hose was equipped with PVDF which can accommodate higher temperatures, has minimal permeability characteristics as well as excellent hydrocarbon and chemical resistance. Furthermore, it has a high performance corrosion resistant barrier. The middle layer consists of Kevlar fabric which permits long insertion lengths. In addition, it has enough flexibility to allow bendability of up to 90 degrees and reduces logistics costs significantly since it can be coiled on transport drums. The outer layer consists of TPU to protect the IFL™ liner during the installation process. The system is completed by high pressure termination fittings guaranteeing a pull-proof and durable connection.

Project Description:

The newly developed IFL™ liner was manufactured at the Raedlinger Primus Line factory in Germany. The produced liner was spooled unfolded onto a specifically developed transport drum that perfectly fits into standard sea containers. After arriving in Malaysia, the IFL™ liner was folded and spooled on a specially designed offshore installation reel. With folding the liner, maximum pulling forces are reduced and long installation lengths can be achieved. Before loading the drum on the offshore support vessel, a pulling head needed to be installed. The pulling winch was placed at the main oil platform and the rope connection was created with a pig that was sent with water pressure through the pipeline to be renovated. After pigging, flushing and gauging the pipeline a 12 m long test section was inserted. Since the pipeline was free from any obstacles protruding into the cross-section of the pipe, the installation was commenced. The pre-folded and coiled IFL™ liner was placed on the support vessel and the installation was started. The insertion of the 1,400 m was performed in less than 7 h. Finally, specifically developed termination fittings were installed and a pressure test was performed before re-commissioning. Cost savings of more than 50% compared to replacement were realized.

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Rädlinger primus line GmbH
Kammerdorfer Straße 16 · 93413 Cham · Germany
Tel.: +49 9971 8088-0· Fax: +49 9971 8088-9999
info@primusline.com · www.primusline.com