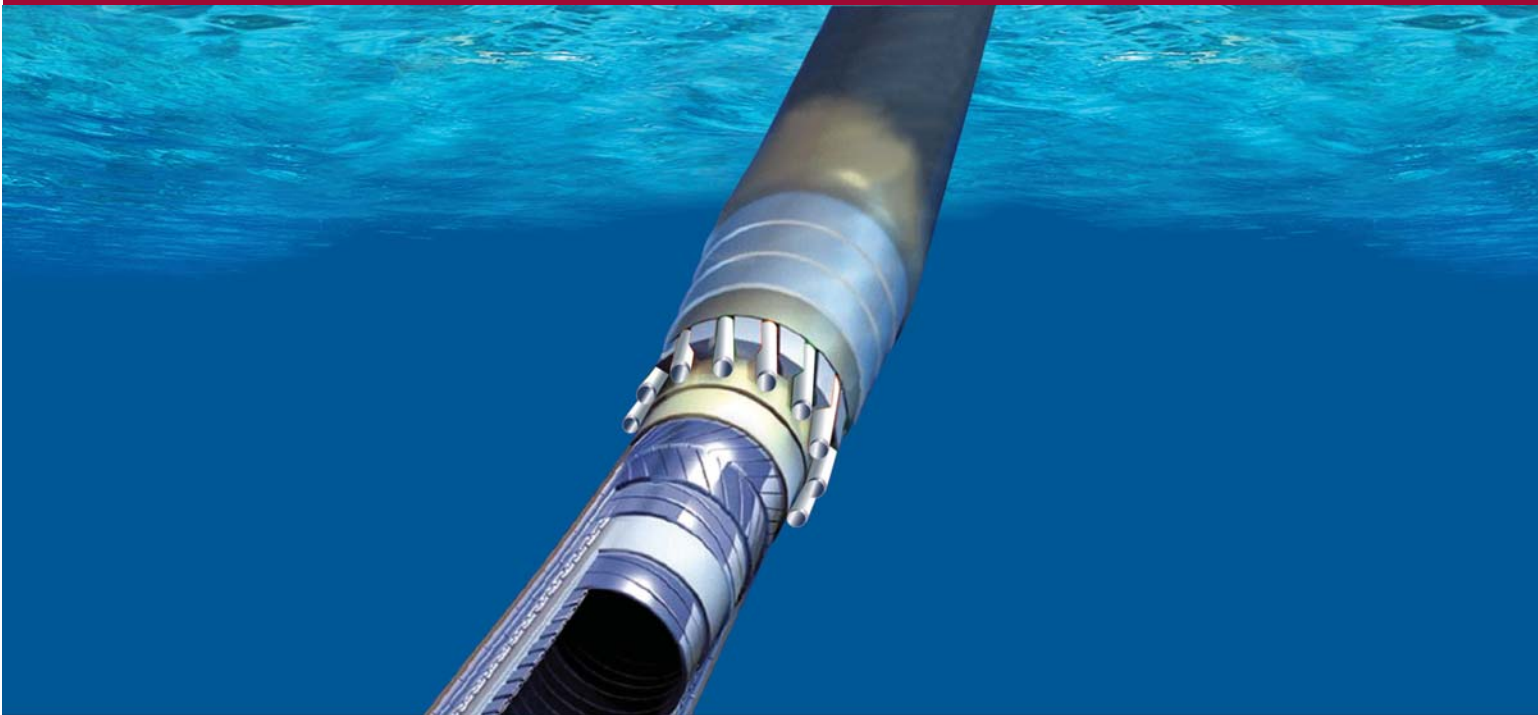




# Integrated Production Bundle

The combination of high efficiency active heating and temperature monitoring for ultra deepwater applications



**Technip**

*take it further.*

# The IPB, innovative technology for ultra deepwater applications

With cutting edge technology, first rate industrial assets, excellence in R&D, a truly worldwide presence and a thorough knowledge of regional stakes, Technip is a leader on the Subsea market.

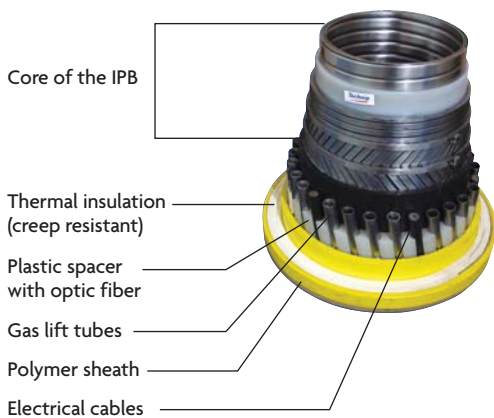
The development of deepwater and ultra deepwater fields has created a need for innovative and cost-effective systems which can combine high thermal insulation and extended cool-down time during shutdown, in order to keep the operating envelope safely outside the zone of hydrate formation or wax deposition.

Technip has developed and qualified the flexible Integrated Production Bundle (IPB) for deepwater dynamic risers, providing an elegant technical solution using all the benefits of flexible systems. The principle of the IPB combines high efficiency active heating and temperature monitoring, which allows safety and flexibility of operation. For the first time, the assembly integrates gas lift and electric heating in a bundle of tubes, cables and spacers assembled in an SZ formation around a 2" to 12" nominal flexible core.

”

The IPBs provided the necessary technology that was commercially attractive.”

Daniel Picard  
Total  
Dalia Project Director



## Extensive Research and Development programme

Development work started in the late 1990s when an electrically heated IPB was manufactured and tested as part of the Demo 2000, an industry sponsored Joint Industry Programme. Technip's R&D centre based within Flexi France, Technip's main flexible pipe manufacturing plant in Le Trait (France) took the opportunity to incorporate a Distributed Temperature System based on optical fibres in the pipe structure. After this earlier Research and Development programme, a further extensive qualification programme was conducted, culminating with a deepwater testing phase offshore Brazil.

The Dalia field development became Technip's first IPB industrial reference.





## The Dalia project

A technological first 2006: first supply and installation of IPB risers at a water depth of 1,350 meters, offshore Angola

**Client: Total E&P Angola**  
**Location: block 17, offshore Angola**  
**First oil: December 2006**

### Flexible IPB risers characteristics:

- Electrically heated and gas lift IPB
- Quantity: 8
- Internal diameter: 10.75"
- Length: 1,650 m each
- Weight: 700 tonnes each (in air empty)
- Installation: Technip's Deep Blue vessel

At the time, the Dalia deepwater field development was one of the largest umbilical, flowline and riser projects ever awarded to a single Contractor as the result of a design competition.

## The Pazflor project

2010: 2 x IPB risers resting at a water depth of 800 meters, offshore Angola

**Client: Total E&P Angola**  
**Location: block 17, offshore Angola**  
**First oil scheduled in 2011**

### Flexible IPB risers characteristics:

- Gas lift IPB
- Quantity: 2
- Internal diameter: 10"
- Length: 1,200m each
- Weight: 503 tonnes each (in air empty)
- Installation: Technip's Deep Blue vessel

The Pazflor field development is the largest Subsea contract ever obtained by Technip.

The award of this major subsea contract follows Technip's successful completion of the Dalia project.

## The Papa-Terra project

2012: first IPB risers offshore Brazil at a water depth of 1,200 meters

**Client: Papa Terra BV**, a Special Purpose Company formed by Petrobras (Operator – 62.5%) and Chevron (37.5%)  
**Location: Papa-Terra field, Campos Basin, 110 km offshore Brazil**  
**First oil scheduled: beginning of 2013**

### Flexible IPB riser characteristics:

- Heavy oil transportation, electrically heated
- Quantity: 6
- Internal diameter: 6"
- Length: 6 x 1,700m, 6 flowlines for a total of 17,155m
- Weight: 336 tonnes each (in air empty)

The Papa-Terra field contains heavy oil. IPB's will be used to increase the temperature of the produced fluid after long shut-downs in order to reduce its viscosity, thus enabling well production restart.

A new and innovative extension to the Distributed Temperature Sensor (DTS) technology has been specially developed for this application and will be incorporated in the IPB for the first time.

**This third contract attests to the confidence that Operators have in the Group and acknowledges Technip's expertise in the design of deepwater subsea infrastructures and technological know-how.**

### Dalia IPB - Design characteristics and capabilities

■ Outer diameter	23" (584 mm)
■ U-value (based on pipe I.D.)	3.5 W/m <sup>2</sup> .K
■ Medium sour service	50 ppm H <sub>2</sub> S
■ Electrical heating	90 - 180 W/m
■ Gas lift rate	15 / 20 MMscufd



#### HEADQUARTERS

##### **Technip**

89 avenue de la Grande Armée  
75773 Paris Cedex 16  
France  
Phone: +33 (0)1 47 78 24 00

#### CONTACTS

##### **Subsea Assets & Technologies Division**

Robby O'SULLIVAN  
Direct line: +33 1 47 78 57 92  
Direct fax: +33 1 47 78 67 83  
Email: rosullivan@technip.com

##### **Flexible Pipe Business Development**

Hugues BERTON  
Flexi France  
Rue Jean Huré - BP 7  
76580 Le Trait  
France  
Direct line: +33 (0)2 35 05 54 26  
Direct fax: +33 (0)2 35 37 49 60  
hberton@technip.com

[www.technip.com](http://www.technip.com)