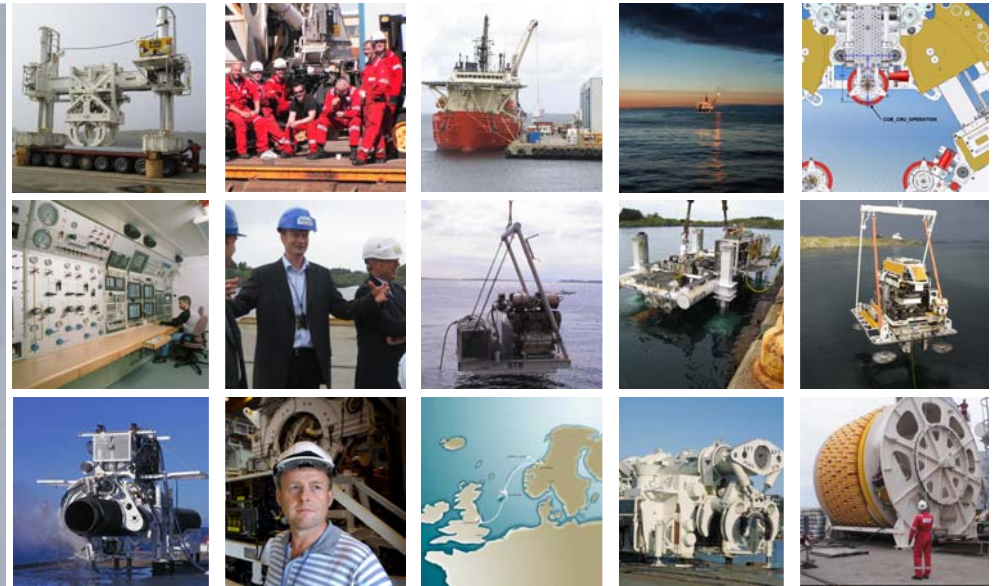


FFU, January 29th, 2009

Tampen Link Hot Tap Project

Jørund Fonneland, Technip Norge AS
Pipeline Repair System





Contents

I What is hot-tap?

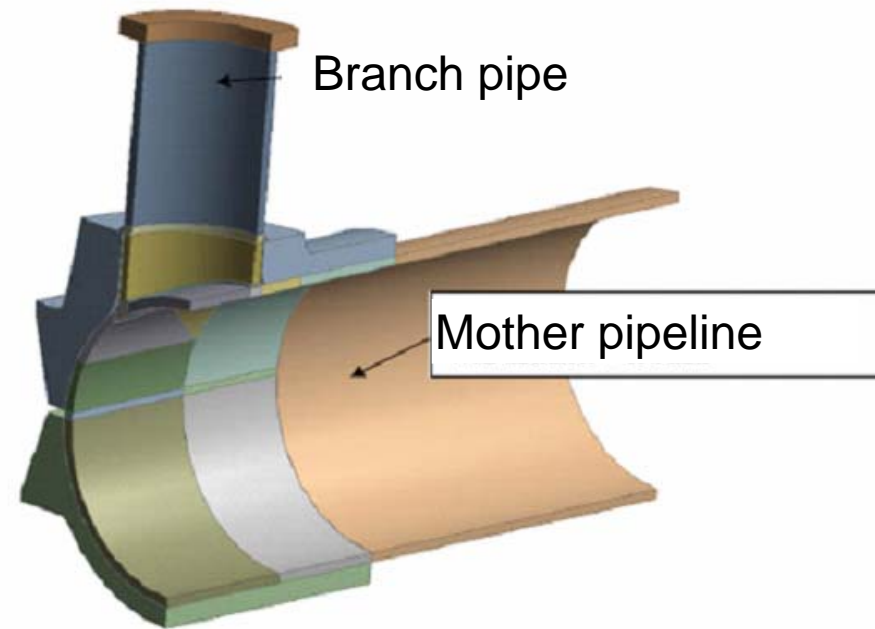
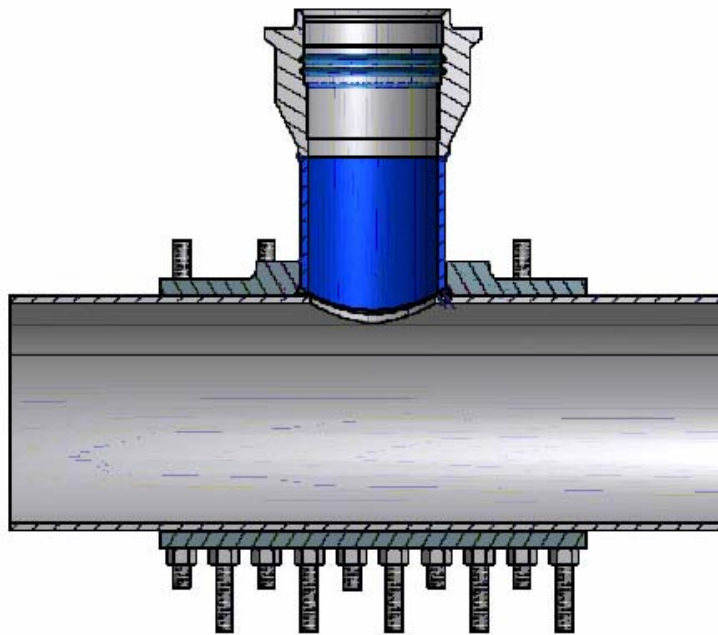
II Tampen Link

III Hot-tap animation for next hot-tap project

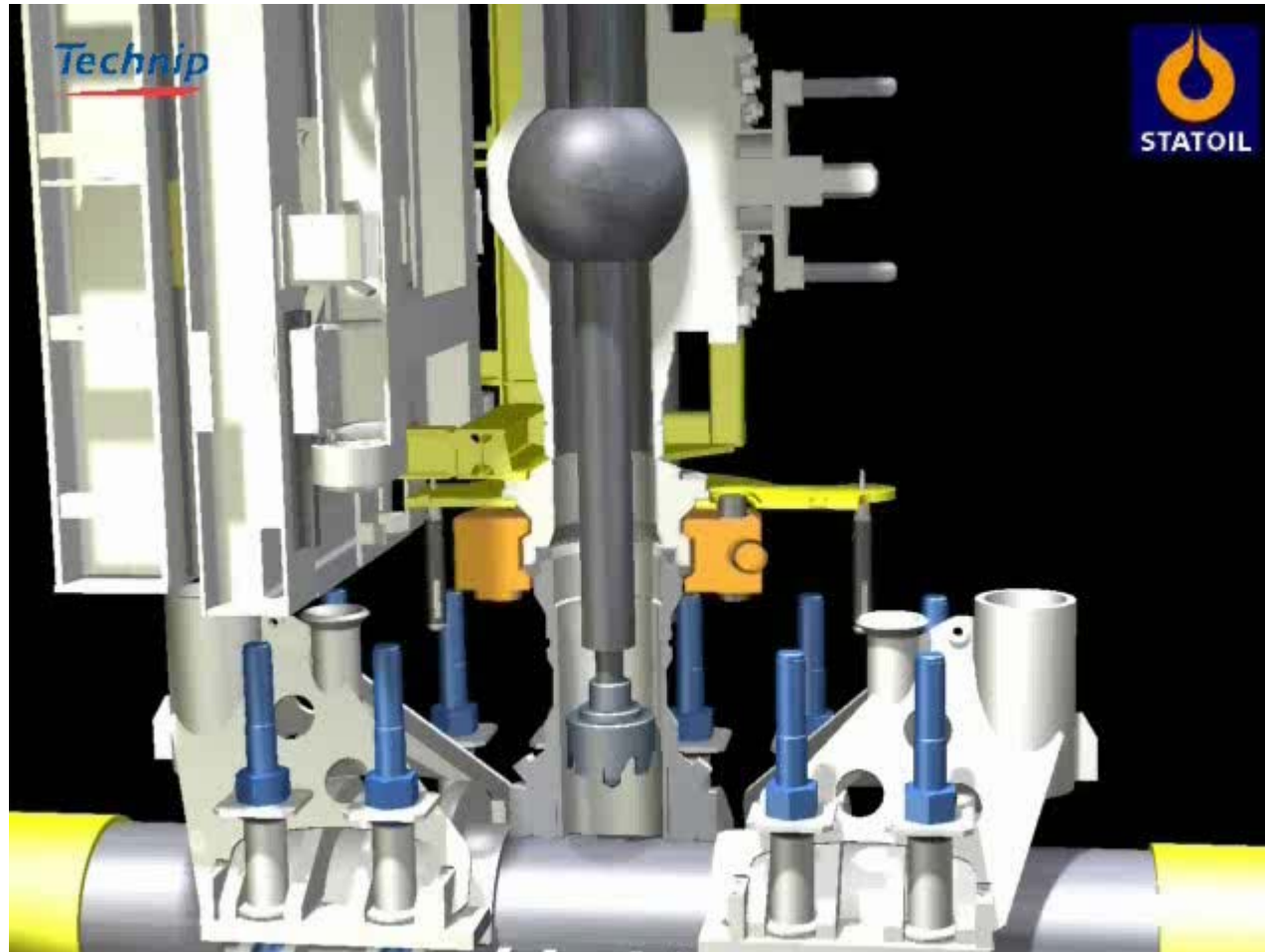
IV Future hot-tap technology

What is Hot-Tap?

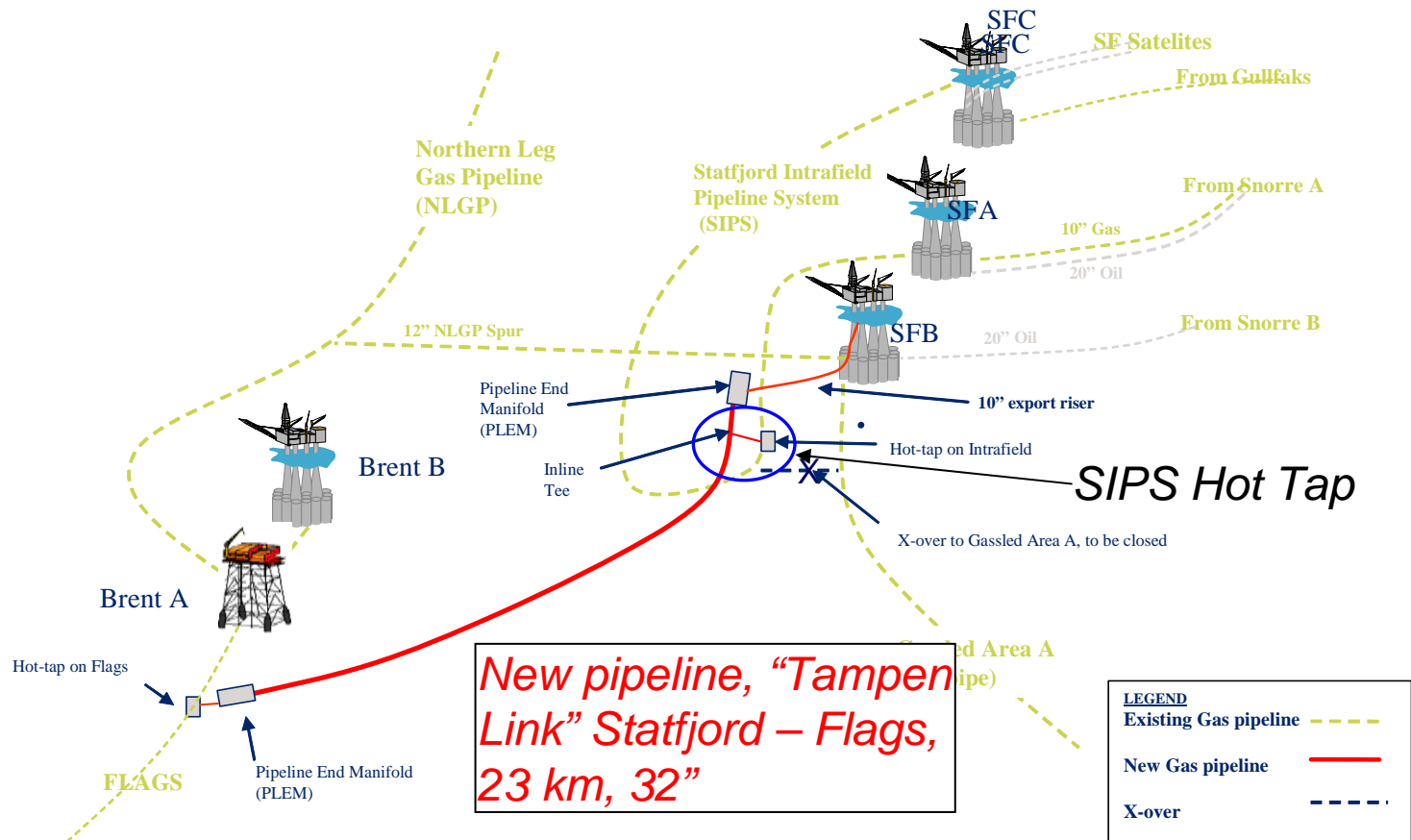
Connecting a branch pipe to a mother pipe whilst maintaining production in the mother pipe



What is Hot-Tap?



Tampen Link Field Layout



Tampen Link History

- ▶ **August 2007, the Tampen Link Hot-tap operation was aborted due to the diver operated Hot-tap tool failing. The Tampen Link project was “put on hold”.**
- ▶ **February 2008, the Tampen Link project called for mobilisation of the PRS Remote Hot-tap tool.**
- ▶ **The scope was to mobilise the never used PRS hot-tap prototype in six months.**



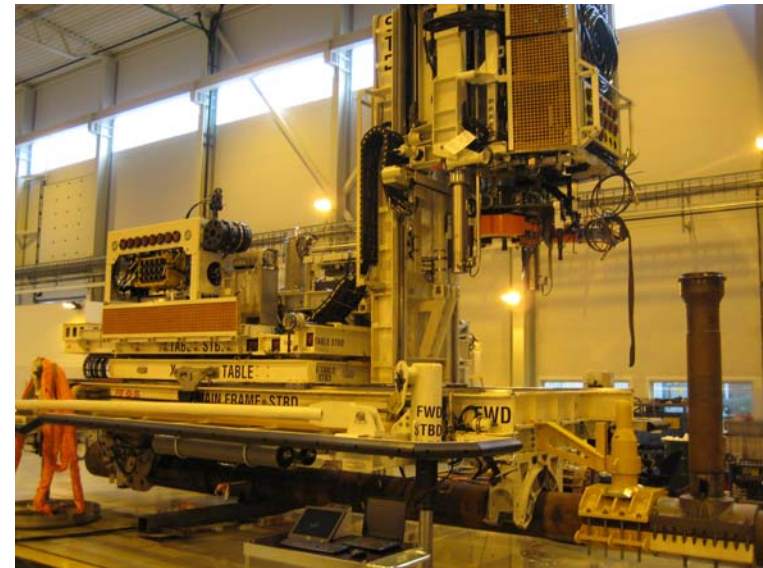
Tampen Link Hot-tap

- ▶ To save time offshore, divers were used for:
 - Observations
 - Seabed preparations
 - Small tasks (e.g. valve operations)
- ▶ Some technical problems offshore resulted in jo-jo lifting of system
- ▶ Hot Tap completed 20. August 2008 without problems



PRS hot-tap machine

- ▶ Categories of CONTINGENCY:
 - Base case according to operation procedure
 - Alternative lines for power and communications using ROV
 - Override functions for ROV directly on cylinders (hydraulic hot stabs)
 - Emergency Disconnect and Recover System (using e.g. hydraulic accumulators)
 - All barriers rated for 12 month service



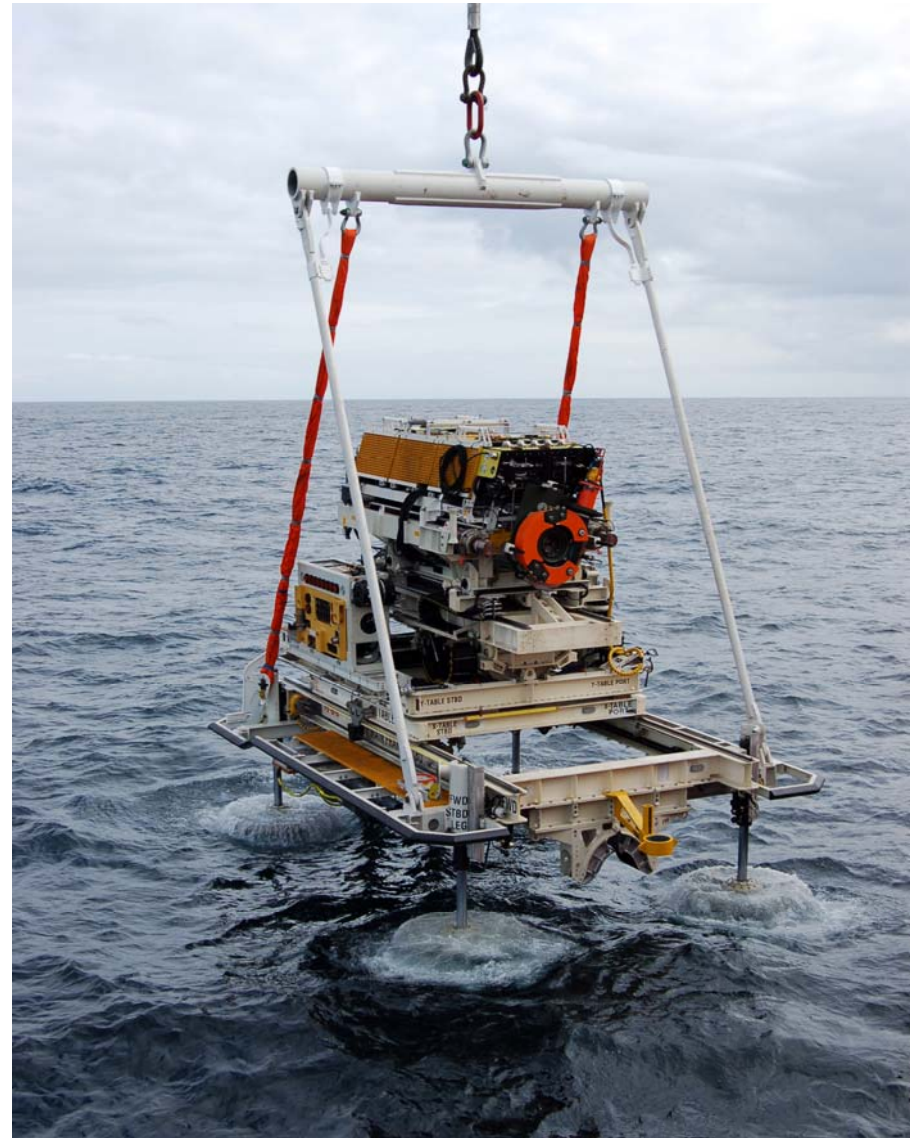
Tampen Link Hot-Tap As-built...



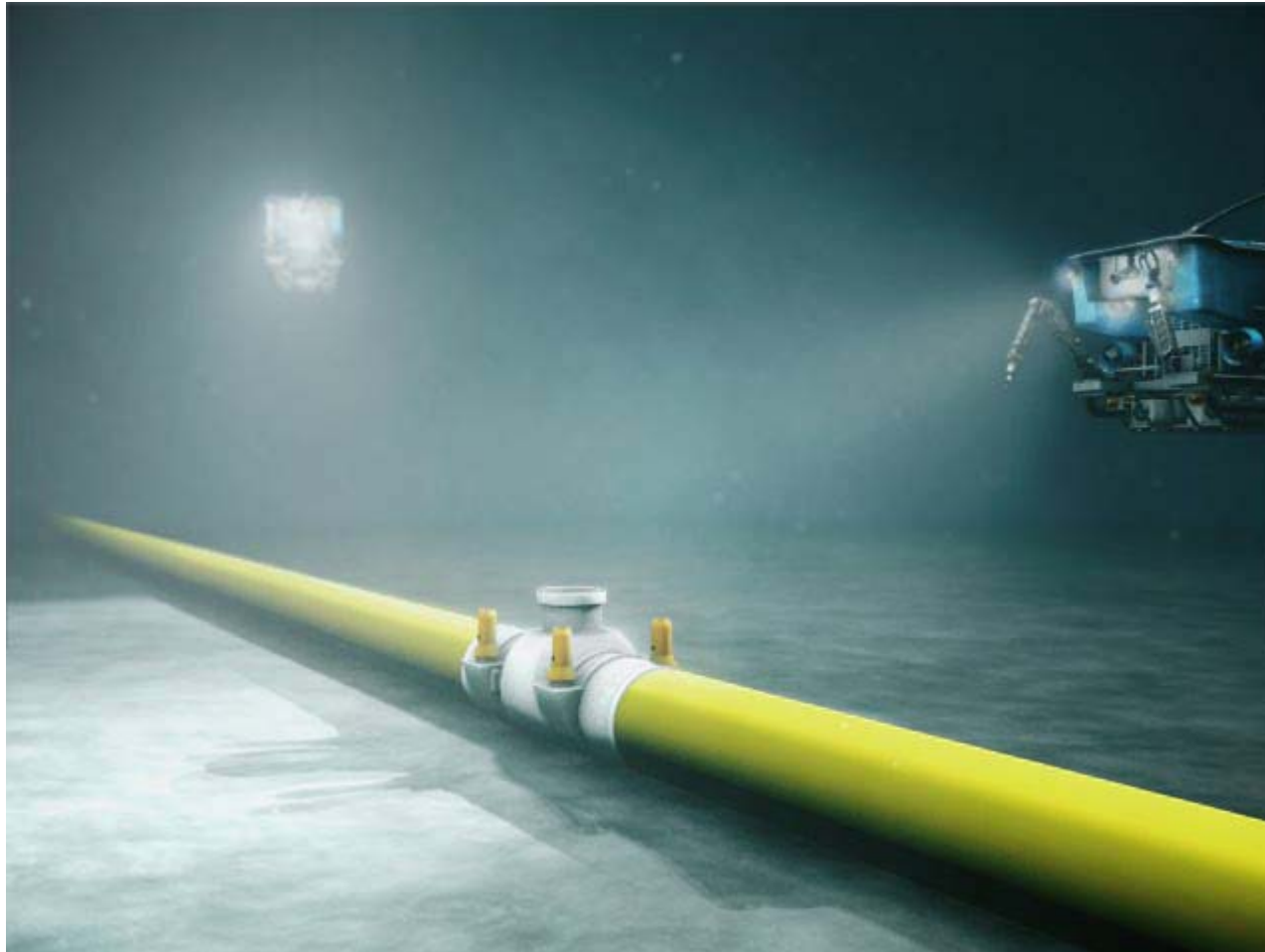
Future hot-taps: Ormen Lange Hot Tap, May 2009

Project data:

- Two hot-taps at Ormen Lange field
- 850 msw
- 100% remote operation
- Minus 5° Celsius outside pipe
- Plus 78° Celsius inside pipe
- Subsea trial is planned for in February 2009 in Sognefjorden, 940msw



Future hot-taps:
Ormen Lange Hot Tap, May 2009



Future hot-taps:
Retrofit Tee installation

