

SUBGAS: SUBSEA STATION FOR DEEP GAS TREATMENT



SAIPEM

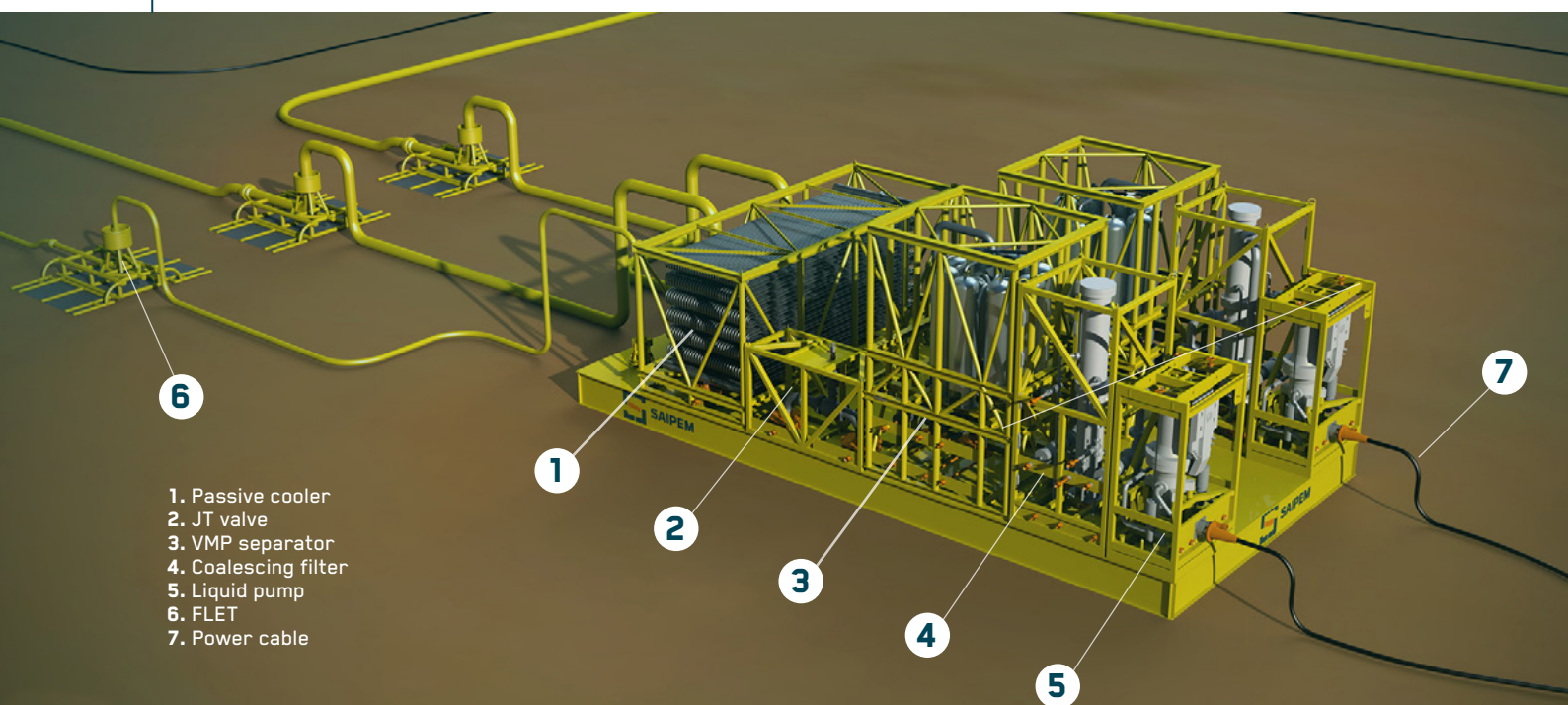
SUBGAS: SUBSEA STATION FOR DEEP GAS TREATMENT

AN INNOVATIVE SOLUTION TO MAXIMIZE SUBSEA GAS FIELDS PRODUCTION

Subsea gas treatment process using dew pointing to separate water and condensates from gas phase by means of a Gas/Liquid High Performance Low Temperature Separation is a way to improve gas fields production. Saipem has developed and qualified an innovative solution for long tie-back of offshore shallow-water & deep-water gas fields.

SUBGAS SUBSEA STATION DESCRIPTION

- Injection of Mono Ethylene Glycol (MEG) in the fluid at well heads position for hydrate inhibition
- Passive cooler, to condense the maximum of heavy hydrocarbons and water
- Joule Thomson valve (JT valve), as low temperature cooling system, to achieve a temperature drop to the required dew point
- Saipem Vertical Multipipe Separator, for Gas/Liquid bulk separation
- Coalescing filter, to remove as much liquid droplet as possible to ensure a dry gas export
- Liquid pump, for the export of water and condensate phase after gas dew pointing



BENEFITS OF THE TECHNOLOGY

- Simple process, high robustness, high maturity level
- It can be implemented over a wide range of long tie backs
- Installation can be performed on brownfields and mid / late life with improvement of NPV
- Hydrate and/or wax formation risk avoided or significantly reduced
- Reduces the pressure drop in gas export line improving reservoir recovery factor
- Removes the risk of slugging

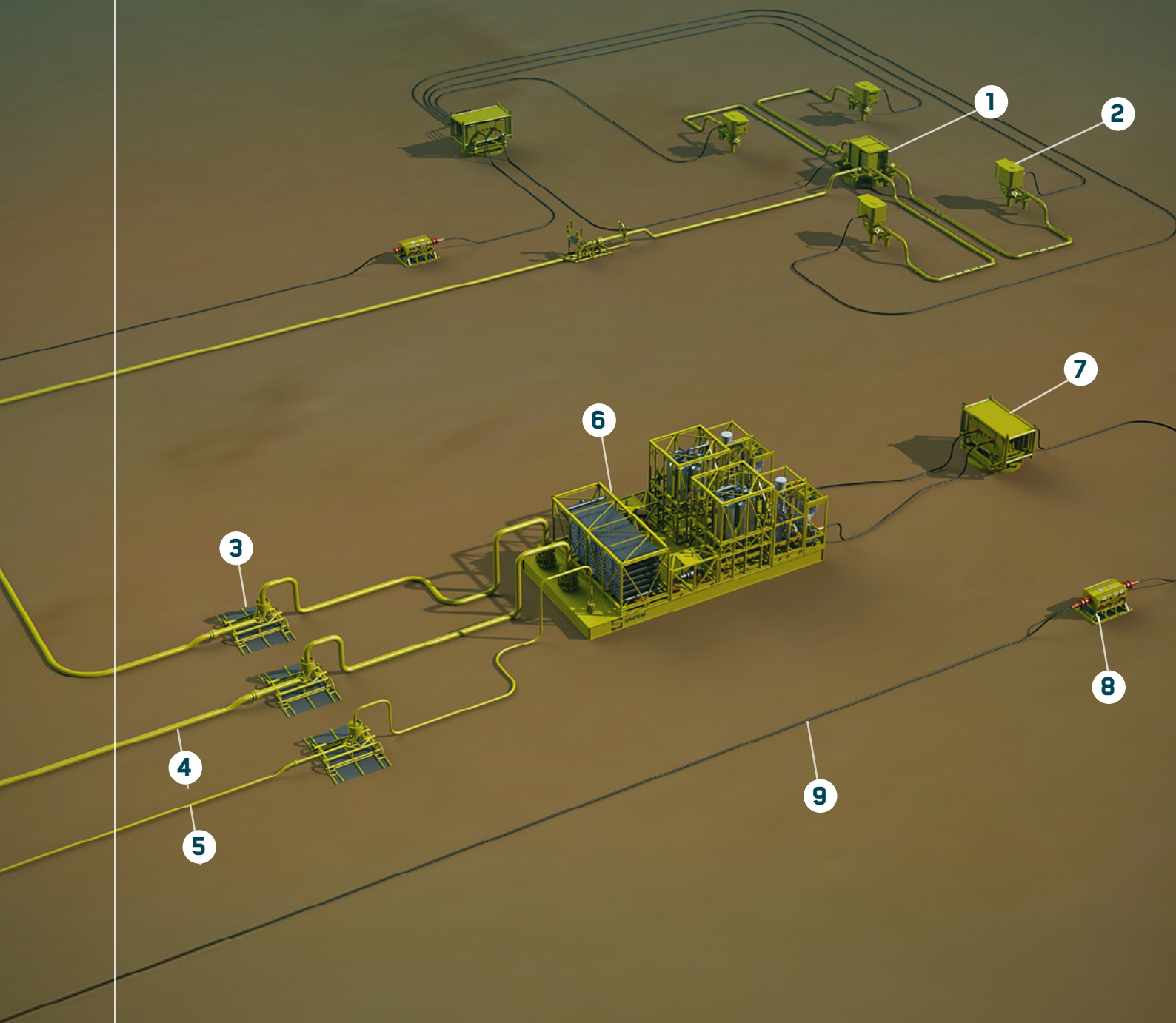
SUBGAS DESIGN

DESIGN DATA

Passive cooler	Composed of one or several long and uninsulated pipes	
JT valve	Axial flow valve as they feature good throttling capabilities, adaptability for large sizes and lower actuation force requirements. While subsea track record includes 8" and 12" sizes, larger sizes can be achieved	
VMP separator	Typical design: • Number of pipes: 4 to 8. • Diameter of pipes: 28" to 42" • Height of pipes: 12 to 20 m	Design data: • Liquid flow rate: 30 to 115 kbpd • Gas flowrate: 10 to 30 MMSCF • Viscosities: 10 to 690 cP • Slug volume: 5 to 70 m³ • Water depth: 1,500 to 3,000 m • Design pressure: 5,000 to 10,000 psi
Coalescing filter	Typical design includes: • Cyclonic device (microcyclones) for filters solid plugging mitigation • Solid filters (depth filtration media cartridges) for filters solid plugging mitigation • Coalescing filter cartridges for high performance gas/liquid separation	

TYPICAL PERFORMANCES

Passive cooler	Fluid is cooled down to typically 15 to 10°C by using the ambient seawater temperature (4°C)
JT valve	JT valve ensures the fluid cooling to the required separation temperature, typically 2 to 3°C
VMP separator	Outlet GVF < 10% vol Outlet LCO < 0.1% vol
Coalescing filter	Usually 0.01 ppm weight liquid in gas outlet



1. Manifold
2. X-mas tree
3. FLET
4. Gas export line
5. Liquid export line
6. Subgas station
7. Subsea transformer
8. Subsea umbilical termination unit
9. Umbilical

QUALIFICATION ACTIVITIES PERFORMED

- The innovative Saipem separator was qualified with extensive testing, performed through 2 JIPs involving TotalEnergies, Petrobras and ENI
- Solid filter contamination capacity tests were performed to characterize the fouling trends of filters in presence of sand





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LET'S KEEP IN TOUCH

