

THE FUTURE FOR FLEXIBLE PIPE RISER TECHNOLOGY IN DEEPWATER: CASE STUDY

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ABSTRACT

Unbonded flexible pipe has been an enabler for deepwater (<3,300ft) and ultra deepwater (>3,300ft) developments for over 15 years. The technology has enabled the industry to initially produce in deepwater in the early 90's and then into ultra deepwater up to 6,500ft in the late 90's. Water depths greater than 6,500ft push the envelope where typical free hanging riser configurations can operate. High tension loads from free hanging pipe weight coupled with high pressure loads creates a challenge for any riser system.

The purpose of this paper is to demonstrate the technical feasibility of unbonded flexible pipe risers in ultra deepwater greater than 6,500ft. A case study is presented herein for a flexible pipe riser: 6-inch internal diameter x 10,000ft water depth x 12,500psi design pressure. The key challenges for this water depth and internal pressure combination are:

- Top tension load
- Collapse load
- Birdcage load

The case study presented herein will quantify each of the key technical challenges and set forth methods for meeting each challenge. Methods for meeting the challenges include: unique riser configurations.

The results of the case study confirm the ability of unbonded flexible pipe to operate in ultra deepwater under high pressures. In addition to the operability of the risers, unbonded flexible pipe offers numerous other advantages in deepwater including:

- Increased flexibility in field architecture, particularly in congested developments
- Re-use as part of the economic assessment
- Pipe is fully tested before delivery – Factory Acceptance Testing
- Reduced operating costs due to minimal maintenance and inspection needs.
- Flexibility of installation methods and scenarios:
 - Pre-installation
 - Wet storage
 - Time saving installation campaigns
 - Low risk abandonment scenario
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