Aquaterra ENERGY | INTELLIGENTLY ENGINEERED

CASE STUDY

Riser Analysis Lite:

HPHT North Sea drilling: unlocking up to $45m savings per well with a lower-cost rig strategy

Location
North Sea

Client
Major North Sea Operator

Product
Riser Analysis Lite

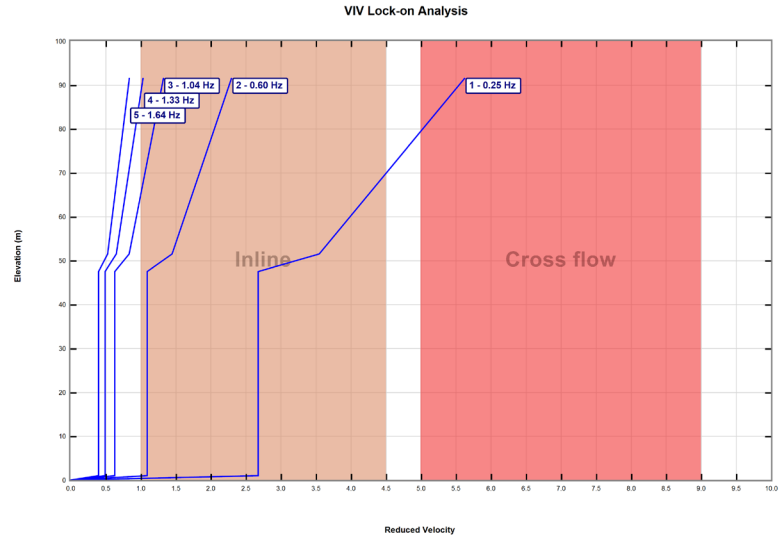
Overview

High Pressure High Temperature (HPHT) wells in the North Sea present some of the most challenging drilling environments in the world. Harsh weather windows, complex structural loads, and tight economic margins require operators to make well-informed decisions early in the project lifecycle.

A major North Sea operator approached Aquaterra Energy to assess whether a jack-up rig paired with a seabed-to-surface well access package, including our AQC-SR subsea drilling riser system, could support an upcoming multi-well HPHT subsea campaign.

The operator wanted to compare this approach with their traditional strategy of using a semi-submersible rig with a marine riser. With rig and equipment decisions needing to be made quickly, the operator engaged Aquaterra Energy's Riser Analysis Lite (RAL) service.

Preliminary results were delivered within half a week, enabling the operator to confidently confirm their rig strategy and unlocking approximately $45 million in potential cost savings per well.



Key Results at a glance:

- **$45million potential cost savings per well**
- **VIV results delivered within half a week**
- **100-year storm operating capability confirmed**
- **300+ days validated fatigue life**
- **Jack-up drilling strategy validated for HPHT wells**

Challenge

HPHT drilling in the UK North Sea requires careful engineering assurance across multiple operational risks, including:

- Robust structural and fatigue integrity
- Confidence in pressure and environmental loading performance
- Assurance around system behaviour during extreme weather conditions
- Clear justification for early-stage rig and equipment decisions

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The economic incentive was clear. In 2024, semi-submersible day rates reached over $415,000 per day, compared with approximately $118,000 per day for jack-up rigs, creating a potential saving of up to $300,000 per day. Across a 300-day campaign, this represented potential savings of up to approximately $90 million, where a jack-up solution could be technically validated.

(Esgian – 2024 Average Rig Day Rates)

Solution

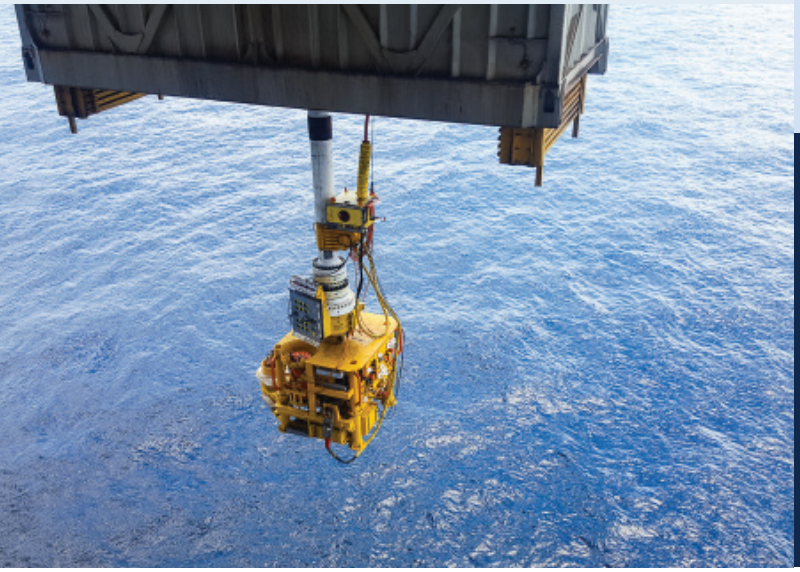
Using our RAL study service, we rapidly assessed whether a jack-up deployed riser system, incorporating the AQC-SR, could safely replace a semi-submersible and marine riser for a planned two-well, 300-day HPHT campaign. Initial results were delivered in as little as half a week from PO and data alignment, accelerating early-stage decision-making.

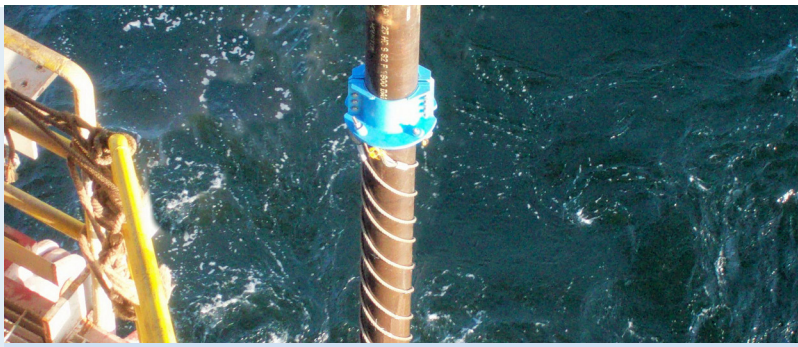
Detailed modelling to API and DNV standards evaluated key constraints that typically drive semi-sub selection, including VIV risk, fatigue life, operating envelope and system behaviour under extreme environmental loading. The analysis confirmed minimal cross-flow VIV risk, removing the need for suppression, while validating structural integrity across all operating and survival conditions.

Critically, the study demonstrated that the AQC-SR riser system could safely operate at tensions up to 400te and remain connected in 100-year storm conditions. This extended the achievable operating envelope beyond what is typically associated with jack-up deployed systems, removing a key technical barrier to their use in HPHT subsea environments.

Fatigue performance exceeded campaign requirements, with validated system capability beyond 300 days, providing further assurance of long-term integrity under demanding North Sea conditions.

Together, these results confirmed that the AQC-SR enabled a jack-up deployed solution to meet the performance, safety and environmental requirements of the campaign, providing the technical justification to select a lower-cost rig strategy over a semi-submersible.





Results

The Riser Analysis Lite study confirmed that Aquaterra Energy's AQC-SR subsea drilling riser system was fully suitable for the operator's planned HPHT wells.

The analysis demonstrated that the system:

- **Met or exceeded all structural, pressure, and fatigue requirements**
- **Could remain connected during 100-year storm conditions, far beyond the typical operating envelope of comparable systems**
- **Provided a technically robust solution for jack-up deployment in challenging HPHT conditions**

By validating the use of a jack-up rig rather than a semi-submersible, the study enabled the operator to optimise their drilling strategy.

Based on a 300-day campaign and 2024 rig day rates, this translated into potential savings of up to approximately $90 million across the programme, or around $45 million per well.

The combination of rapid analysis, clear engineering assurance, and significant cost reduction allowed the operator to progress their North Sea HPHT programme with reduced risk and a far stronger commercial position.

Offshore Anaylsis, Intelligently Engineered.

Find out how Aquaterra Energy delivers rapid, low-investment offshore analysis that helps operators de-risk projects and optimise drilling strategies early.