APACHE NORTH SEA
10K RISER

CASE STUDY

THE CHALLENGE

During its 2011 drilling program Apache North Sea Ltd. was preparing to develop the Bacchus field, approximately 7km east of the Forties Alpha platform in the North Sea. Three subsea wells were to be drilled from the Rowan Gorilla VII.

To allow these wells to be safely drilled and completed, Apache North Sea required a high pressure, 10,000psi rated, full bore drilling Riser System, complete with a DWHD H4 connector, surface HPU (hydraulic power unit) and control umbilical.

THE CONTRACT

Aquaterra Energy was contracted to design and deliver a ‘world first’ 10,000psi rated, 25” OD full bore drilling riser, together with associated subsea connector and installation equipment with surface tensioning. Also supplied was a complete fatigue monitoring system, including strain gauges and motion sensors, two subsea enclosures and a wave radar system.

Following successful conclusion of the first two wells, Apache North Sea decided to revisit the Bacchus field to complete a third well, Bacchus Far West (B1). Aquaterra Energy was appointed to conduct a comprehensive maintenance program on the 10k Riser System and work with Apache North Sea to re-install the system onto the third well, with the use of the Rowan Gorilla VII.

EXECUTION

Building on the success of its 5,000psi Riser System, Aquaterra Energy produced a 10,000psi system, in collaboration with Oil States Industries (UK) Ltd, using its Merlin connectors.

The 10k System is a ‘world first’ - never before have Merlin connectors been used at such a high pressure in such a large size, for this application.

To cope with the increased pressure and anticipated loads, the pipe for the joints were fully forged with a wall thickness of 2.5” and the overall dimensions of the Merlin connector were increased greatly.

The Aquaterra Energy team’s experience and understanding of high pressure risers, from analysis to design, equipped them to oversee and implement the full scope of supply to Apache North Sea – its dedicated in-house team of Drilling Riser Engineers provided design engineering, project management, operational expertise, and managed the delivery of the Riser System. The installation marked the first Riser System of this kind to be run anywhere in the world.

RESULTS

The equipment for Apache North Sea was mobilised in August 2011 and arrived back at Aquaterra Energy’s warehouse at the end of July 2012. During this time the full Riser System had been successfully run and pulled eight times, including jumping between the first well (East) and second well (West).

The subsequent maintenance program on the 10k Riser System was completed within a tight schedule and on 5th April 2013 the riser was successfully run and landed on the third well, Bacchus Far West (B1).

Through the partnership between Apache North Sea and Aquaterra Energy a unique 10k rental Merlin Riser System is now available to the offshore oil and gas market.

Ben Cannell, Project Manager who was responsible for the overall project at Aquaterra Energy, commented: “The overall project was extremely interesting with many engineering and operational planning challenges throughout requiring continued focus from the project team. We have all been delighted to be involved with this significant ‘world first’ full bore 10k Merlin Riser System project which has further strengthened our riser team and product lines as clear market leaders for High Pressure Riser Systems.”

Cannell added: “A positive working relationship and excellent communications between Aquaterra Energy and Apache North Sea throughout the offshore operation ensured that the Riser System was installed to plan and throughout the whole duration of the campaign the riser was pulled and re-run without any issues. Aquaterra Energy saved Apache North Seamen hours of rig time during the operational phase by adapting the running and retrieval method to maximise the efficiency of running the riser on the Rowan Gorilla VII.”

Since project completion, Aquaterra Energy is now in the process of developing a rigorous storage and maintenance schedule for the 25” Riser System. As well as the physical preventive maintenance and storage of the system, Aquaterra Energy will document and record the current fatigue utilisation at a component level for the entire system using the data from the riser monitoring system. This approach allows Aquaterra Energy to intelligently perform maintenance and retire joints whilst getting the very best performance and lifetime from the system.