

CASE STUDY

Shell U.K. Exploration and Production (Shell Expro): Brent Alpha Redevelopment, North Sea

Design Verification Of Flexible Pipe System And Ongoing Technical Consultancy



Shell Expro recently set about adding ten years of extra life to one of the North Sea's longest serving platforms, Brent Alpha. The Brent Alpha Redevelopment (BAR) project involves converting the Alpha platform to lighthouse mode, that is, day-to-day monitoring, control, power supply is performed from another platform, in this case Brent Bravo. As part of this project, a flexible flowline was installed between Alpha and Bravo to carry the mixed wellhead production from Alpha to Bravo. For the first time in the UK sector of the North Sea a flexible riser in a free hanging catenary configuration was used to connect the flowline to the Bravo platform. MCS provided advice to Shell Expro relating to this riser and also verified the design which was performed by Wellstream, Newcastle. Of specific interest was the fatigue loading on both the riser and the hang-off structure. MCS, as a worldwide, independent expert in flexible pipe technology was well positioned to provide this support to Shell Expro.

SOLUTION

- Performed an assessment of the free hanging catenary riser option to evaluate and rank potential risks.
- Developed the Flexible Pipe Specification for the procurement of the flexible pipe.
- Assisted with the specification of enhanced riser loading characteristics resulting from the interaction of the wave environment with the platform.
- Performed independent verification of the Wellstream design.
- Provided support for the fatigue analysis of the riser structure.
- Supported Wellstream and Shell in solving fatigue associated issues for the flexible riser, ancillary equipment (bending stiffener) and hang-off assembly.

RESULTS

- Utilising our extensive operational knowledge and a risk assessment approach, MCS assisted Shell Expro in their decision to use either a rigid linepipe or flexible riser as the tieback option for the BAR project. The use of a flexible pipe resulted in significant savings in CAPEX.
- The provision of a proper Flexible Pipe Specification provided clear requirements as well as ensuring that the project specific requirements were communicated effectively to the potential flexible pipe suppliers.
- Performing independent flexible pipe fatigue analyses helped highlight issues that may not have otherwise been brought to the fore in the project.
- Our system approach to verification helped ensure that all contractors had the same interpretation of design data.
- As a result of our involvement, a material influence was brought to bear on the final design to the benefit of our client Shell Expro.

If you would like more details, please contact us at Aberdeen@mcs.com

www.mcs.com