

SUCCESS STORY



Yokogawa Completes Successful Automation Replacement and Start-up at BP Bruce Offshore Platform

Location: North Sea, UKCS
Start-up Date: November 2009
Industry: Oil & Gas



Executive Summary

Yokogawa has achieved an outstanding performance on the Bruce Turnaround (TAR) as the main automation contractor (MAC). The Bruce field was discovered in 1974. It is one of the largest fields in the UK North Sea, containing estimated oil reserves of 2.6 trillion cubic feet of sales gas and 250 million barrels of condensate, NGLs, and oil. Located in the northern North Sea, 340 km northeast of Aberdeen, the Bruce field occupies an area of 75 km² spanning license blocks 9/8a, 9/9a, and 9/9b. The complex is in a water depth of 121 meters and was installed in 1992. The co-ventures involved with Bruce in the main field are BP, Total, and Marubeni. The Rhum field is a subsea tie-back to the Bruce platform and came on stream in Q4 2005. Partners in the Rhum field are the Iranian National Oil Company and BP. The Bruce complex processes the fluids from this field. First sales gas from Bruce was delivered in October 1993. The platform is capable of processing 620 mmscf/d of gas and 80 mbd of oil, with current production rates of around 500 mmscf/d. The field life has been extended with the recent Rhum and low pressure Bruce compression development. This is one of the largest offshore platforms within the UK Continental Shelf (UKCS).



Bruce platform

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The Challenges and the Solutions

Yokogawa was selected by BP as the MAC for the Controls Improvement Project (CIP) to deliver a best-in-class integrated control and safety system (DCS/ESD/F&G) to replace and improve on the reliability of the existing ABB DCS and ICS safety systems. This is the largest brownfield MAC project for BP in the UKCS. As a brownfield project on an operating platform, the major challenges were the definition of the project scope for the implementation phase, document verification, changeover planning, and interfacing to the existing infrastructure. The project implementation phase was followed by a successful installation and smooth cutover to the new integrated control and safety system during the demanding TAR period on the platform, with the subsequent start-up and commissioning phase completed on schedule.

The CIP on Bruce was the largest system replacement undertaken by BP in the North Sea to date, resulting in successful cutover of 6,500 hardwired I/O and some 3,700 serial signals. A united one-team approach was adopted by the three main parties BP/WGE/Yokogawa for the management and implementation of the cutover and commissioning phase. This unified approach resulted in achieving completion on schedule and the subsequent re-introduction of hydrocarbons onto the facility. No significant technical issues were encountered that inhibited plant start-up, a truly remarkable achievement for an undertaking of this magnitude and complexity.

The success of the project was directly attributable to good planning and well defined scope with all parties working as an integrated team. The CIP team utilized established and highly experienced personnel working to clearly defined roles and responsibilities. All the stakeholders were involved in the key decision making process, having a common goal with open communication and no problem passing, thus minimizing abortive and duplicated work. As a result of this approach the critical cutover period was kept to a minimum, with the scheduling and implementation of non-essential activities outside of this period.

Throughout the project phase there was a constant focus on team integration and utilization of the correct people skill sets in order to maintain continuity, stability, and delivery of a quality solution.



Bruce control room

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Customer Satisfaction

Comment from Steve Barber, Project Manager for the Bruce CIP Project:

“Yokogawa have worked collaboratively with the BP team through the many challenges of the project implementation and the subsequent installation on the platform, consistently meeting the demanding TAR requirements on or ahead of schedule in preparation for the successful start-up and recommissioning of the platform. Lessons have been learned which will benefit the management and planning of future brownfield projects.

We commend Yokogawa for their support and dedication, especially during the challenging installation, cutover, and start-up / commissioning on the platform.”

After two years operation, Steve Barber has added more comments:

“This project is the largest system replacement to date in the UK North Sea. The past two years have seen exemplary performance with not a single integrity issue or production loss attributed to the system from initial commissioning till today. The previous system was causing production losses from time to time within such duration. Operator acceptance of the system has been exceptional and has resulted in increased awareness and ability to handle process upsets, easier process fault diagnosis and more expedient restarts.

The Control Room Technicians quickly settled into operating the system and have had nothing but praise. To underpin the systems reliability and flexibility we carried out an online ESD download today with no adverse effects to the plant. When this sort of engineering work can be carried out with the platform on line it really does instil confidence, the system as well as the Yokogawa Engineers, throughout the team and facilitates a far better modification efficiency.

This performance could not have been achieved without a huge effort by the project team, our operations partners, our engineering contractor and our Main Automation Contractor.

The end outcome is testament to their hard work, diligence and professionalism.”



Steve Barber
Project Manager
Bruce CIP Project

Key Project Performance Achievements

- Excellent health, safety, security, and environment performance
- No impact on TAR execution
- Project installation and start-up to schedule
- Smooth and safe changeover to the new system
- High level of system integrity, reliability, and quality management
- Easy to use system with good local support resources for smoother handover to the operators
- One-team approach with client project team
- High level of customer satisfaction.

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<System Details>

Integrated control and safety systems: CENTUM CS 3000 (for DCS), ProSafe-RS (for emergency shutdown/fire & gas)

Number of hardwired I/O: 6,500

Number of serial I/O: 3,700

Number of cabinets: 127

Number of graphics: 600

System distributed across 8 local equipment rooms (LERs)

System information:

DCS: 18 x FCS, 3 x ENGS, 10 x HIS, 1 x HIS-TS

1 x ExaOPC server for interface

2 x LCD screens (52" HD), 1 x LCD screen (55")

ESD/F&G: 24 x SCS