

TOTAL E&P overcomes obsolescence issues with a Trusted solution

Major Oil & Gas operator improves and upgrades its operations thanks to fault-tolerant solution from Rockwell Automation

Solutions

A Rockwell Automation solution was installed, which included:

- Trusted TMR ESD controller
- Trusted TMR F&G controller

Results

- Concurrent installation and effective use of scheduled downtime meant there was negligible impact on production
- Remote platform control
- Commonality of spares, maintenance and vendors across sites
- Utilisation of existing equipment, such as safety system infrastructure and cabinets
- Improved operator ergonomics
- An excellent record of no LTIs during the project
- Nominated for HSE safety award



Background

TOTAL E&P UK Limited is one of the main oil and gas operators on the UK continental shelf, where it continues to invest heavily. Employing around 750 staff at its Aberdeen headquarters, the company's portfolio includes operatorship of the Alwyn Area fields, the high pressure/high temperature Elgin and Franklin fields and the St Fergus Gas Terminal, together with a number of non-operated fields.

The North Alwyn complex, located on the UK continental shelf 440km northeast of Aberdeen, commenced production in 1987. The Dunbar platform located 22km to the south of the North Alwyn complex exports oil and gas to North Alwyn via a multi-phase pipeline, which commenced production in 1994. Dunbar is a minimum-facilities platform with minimal process facilities, a drilling derrick and living quarters. Electrical power is supplied from the North Alwyn generators via two submarine cables. Alwyn Area produces approximately 100,000 barrels of oil equivalent per day.

Due to a number of obsolescence issues, Total E&P UK Ltd. called upon Rockwell Automation to supply engineers, components and support for a number of systems upgrade across the two platforms, with the majority of the work taking place on the Dunbar facility.

LISTEN.
THINK.
SOLVE.

 Allen-Bradley • Rockwell Software

**Rockwell
Automation**

Challenge

The upgrade encompassed a number of systems: the emergency shutdown (ESD) system, the fire and gas (F&G) safety system, the Process Control System (PCS) System and the vibration-monitoring systems.

The primary challenge faced by the engineers was the delivery of an upgraded control and safety system with minimal disruption to operations and, critically, they had to carry out all upgrade activities in a safe manner. They also had limited windows in which to complete the work, with just two opportunities to do the upgrades. The first was during a planned shutdown period – normally two or three weeks in the summer period, and the second was through concurrent replacement of running components and infrastructure elements prior to the shutdown.

Overall, the main objectives were to replace system components to overcome spurious trips and major obsolescence issues, while having spares available until at least 2020, provide the facility for future remote operation of Dunbar from North Alwyn, implement a cost-effective upgrade with minimal risk to production and, of vital importance, complete the upgrade with no risk to the safety of the platform, personnel or the environment.

Satisfaction of this final objective was considered a great success in the overall project, with the engineers from Rockwell Automation being nominated for a Health & Safety award.

Solution

The strategy for the upgrade comprised a number of individual, but not mutually exclusive steps. The PCS



Alwyn North consists of two platforms (NAA and NAB) linked by a 73m steel bridge. NAA is the drilling and accommodation platform and NAB houses the processing facilities.



System was upgraded prior to the shutdown, being installed in tandem with the existing system to maintain production capacity. The F&G system was also upgraded prior to the shutdown and the ESD solution was upgraded during the shutdown in parallel with the other new systems being bought on line.

Rockwell Automation was assigned as EPC contractor with responsibilities for placing orders with all equipment vendors, completion of all detailed engineering, organising control and shipment of all materials to site, supervision of vendor site installation and commissioning activities and management of the sub-contractors. Rockwell Automation upgraded the ESD and F&G systems with a single Trusted triple modular redundant (TMR) ESD controller and a single Trusted TMR F&G controller.

Trusted is a fault-tolerant control and safety system that is designed to meet the most stringent international safety standards, helping towards the integrity of a control system that could – if it failed – compromise process profitability. It has triplicated processing paths (slices) within each module, along with high levels of diagnostics and voting between the paths – thus producing a fault tolerant architecture with excellent reliability.

Unlike non-TMR control systems, Trusted gives virtually 100 percent uptime, without compromise to the safety integrity of the system. It is approved to TUV AK6, the highest possible rating for programmable safety systems and also carries approvals for NFPA72 and Gosstandart of Russia.

The existing system comprised an ICS 2000, a legacy safety system from Rockwell Automation. The Dunbar system Upgrade (DSU) replaced the processor and output

sub-system with the Trusted processors and engineers were also able to do controlled online (maintaining production) migration of the upgrade by doing a large amount of planning and risk assessment beforehand.

According to Wullie Nicolson, EDS Principal Engineer at Rockwell Automation: "The work comprised destructing one half of the old dual ICS2000, and constructing the new Trusted in that space, then configuring the input subsystem so the input data was available on both the old and new systems concurrently; this way engineers could verify the processing logic and output states before transferring outputs to the new system. There was then a controlled migration of the outputs from the old to the new.

"The key to the success," he continues, "was maintaining the flow of information between the TOTAL operations personnel and ourselves. This way the operators always knew what had been migrated and which of the systems was controlling each piece of equipment. The relationship between ourselves and TOTAL was excellent and made a big difference!"

"One of the most important aspects from TOTAL's perspective was safety. We base many of our operational statistics on safety and I am pleased to say that this projects was exceptional in these terms."

Results

"One of the most important aspects from TOTAL's perspective was safety," explains Derek Thomson E&I Projects Manager, TOTAL E&P. "We base many of our operational statistics on safety and I am pleased to say that this projects was exceptional in these terms. The engineers from Rockwell Automation arrived on the platform and integrated into a safety culture right away."

One of the potential features of the new installation will be the ability to control elements of Dunbar from Alwyn. The legacy system was designed to incorporate this feature, but it was never used, however it is envisioned that it may be put to use in the future. "The primary drive was down to reliability," Thomson explains, "we are now into phase two of the upgrade project with Rockwell Automation, reinforcing the strong bond we have. It also demonstrates how pleased we have been to be working with them."



Dunbar with Sedco 706 alongside

Concluding, Adam Howard, EPC Operations Manager at Rockwell Automation explains: "We won this project against incredibly strong competition from incumbent suppliers. I like to think that it was our mix of skills, combined with positive and proactive approach and the introduction of an innovative risk/reward approach were the key factors in winning the business."

Additional Information

www.rockwellautomation.com

The results mentioned above are specific to Total E&P's use of Rockwell Automation products and services in conjunction with other products. Specific results may vary for other customers.



Listen. Think. Solve. and Allen-Bradley are trademarks of Rockwell Automation, Inc.
Trademarks not belonging to Rockwell Automation are property of their respective companies.

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

