

SUCCESS STORY



CACT Offshore Platform Reduces Unplanned Downtime by Migrating from Legacy PLC System to Reliable CENTUM CS 3000

Location: Hui Zhou, China
Order Date: March 2004
Completion: April 2006
Industry: Oil & Gas



Executive Summary

The Hui Zhou 21-1A (HZ21-1A) offshore gas production platform has been operational since 1990. It is in the South China Sea, 130 km south of Shenzhen, China, and the water depth at this location is approximately 115 meters. The HZ21-1 gas field is operated by CACT Operators Group (CACT), a joint venture between CNOOC Ltd., Eni China BV, and Chevron Corporation. Four wells in this field produce 54 million cubic feet of natural gas per day. After processing, this gas is piped to a natural gas terminal in Zhuhai through subsea pipelines.

In 2004 CACT began construction of the HZ21-1B platform to house facilities for the compression and dehydration of gas. Now completed, this platform is positioned near HZ21-1A, and a bridge has been built to link the two platforms.

As part of its ongoing activities to develop the HZ21-1 gas field, CACT has also made modifications to HZ21-1A. This included the migration from a legacy PLC control system – for which spare parts were no longer available – to Yokogawa's CENTUM CS 3000. CACT's principle aim in this was to improve efficiency and productivity by acquiring the ability to monitor and control production data in real time. A further benefit of this migration was that the new production control system could be integrated with the control system on the new HZ21-1B platform, allowing HZ21-1A to convert to unmanned operations.

Yokogawa Engineering Asia and the CACT project team worked closely with Aker Kvaerner in Singapore and the China Offshore Oil Engineering Corporation (COOEC) to ensure smooth execution of this project. All systems and products were delivered to the COOEC construction yard in Tongu, China ahead of schedule.

The Challenges and the Solutions

Challenge 1

Maintenance is a big issue on all offshore platforms. Maintaining equipment which is located hundreds of kilometers from shore can be costly and time consuming. Unanticipated equipment failures can quickly lead to platform shutdowns costing millions of dollars in lost production. The various Yokogawa systems and products including the CENTUM CS 3000 have proven to be highly reliable and have caused no unplanned shutdowns, providing major cost savings for CACT. This has also eliminated various safety and environmental risks.

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Challenge 2

The HZ21-1A platform operations management team required the collection of key process and production data for transmission to the Zhuhai gas terminal via a satellite communications system. Accurate real-time measurement of production data is essential for the management of gas distribution. The data gathered by the monitoring and control system can also be used to detect gas leaks in the pipeline.

Challenge 3

CACT's process control and instrument engineers are responsible for keeping down the cost of configuration changes to the control system. With the CENTUM CS 3000, it is possible for CACT engineers to modify the system configuration, download software updates, and hot-swap I/O cards while the process control system is online.

Challenge 4

CACT places a high priority on protecting the environment. For example, after removing water that has been produced by a separator, the company treats it to bring it up to government standards before discharging it. The pH and conductivity levels are accurately measured by Yokogawa's analytical instruments, which are linked with the control system so that alarms can be issued and the water treatment system shut down if set limits are exceeded.

Customer Satisfaction

"Yokogawa's reliable, proactive, and responsible approach made a significant contribution to the project's success. The positive and cooperative approach of your team facilitated teamwork and good relationships. We commend your project team for this great effort and look forward to working with you in the future."

David Godard, HZ21 Gas Project Manager

Factory Acceptance Test



CENTUM CS 3000



ESD console



CCTV

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HZ21 Project – System Configuration

The new control system designed and built by Yokogawa for CACT's HZ21 gas field project consists of the following sub-systems and components:

CENTUM CS 3000 platform process control system

ProSafe PLC safety shutdown system and fire & gas system

FieldEye CCTV system

Local area network

Satellite communications system consisting of a satellite dish, ODU, VAST modem & router, PABX telephone system, and PAGA system