

## SUCCESS STORY



# LPG Terminal Operates Safely and Efficiently with CENTUM CS 3000 and ProSafe-RS Solution

**Location:** Zhuhai, Guangdong, China  
**Order Date:** May 2005  
**Completion:** August 2007  
**Industry:** Oil & Gas



## Executive Summary

BP is the largest LPG importer and operator in China, and is mainly engaged in the LPG wholesale market. Following its construction of the BP Zhuhai LPG terminal on Gao Lan Island, which is located near the city of Zhuhai in Guangdong Province, the company has financed a phase II expansion project that will bring online two new 200,000 m3 underground storage facilities. With the completion of this project, this will be China's second largest LPG terminal.

As part of this expansion project, Yokogawa successfully installed an integrated control and safety system that makes it possible for a single operator per shift to run the entire terminal. The terminal is quiet and well managed 24/7/365.

## The Challenges and the Solutions

### 1. Operational safety

After the liquefied petroleum gas (LPG) is offloaded from a tanker at the jetty and passed through a heating process, it is stored in huge underground tanks. As LPG is a highly explosive gas, it must be handled with the utmost care. The new integrated control and safety system enhances safety by making it possible for an operator at a single human interface station (HIS) to monitor all of the terminal's operations as well as safety loops. For added safety, individual loops are configured at different safety integrity levels (SIL), up to SIL3. Yokogawa ProSafe-RS is certified to SIL3 and also meets the IEC 61508 and IEC 61511 functional safety management (FSM) standards. In addition, CCTV video surveillance systems for the new tank facilities have been seamlessly integrated with existing CCTV cameras to enable surveillance of the entire LPG terminal. All live CCTV video feeds as well as recorded video can be accessed from the CENTUM CS 3000 system. Multiple STAHL remote terminals have also been installed for truck loading. A DCS screen has also been configured to function as a backup, allowing loading operations to be controlled from the central control room if one of the STAHL terminals fails.



Central control room



Waiting to load LPG

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## 2. Project execution

Although the engineering, procurement, and construction (EPC) contractor for this project was based in Singapore, BP emphasized that the work had to be carried out by Chinese project engineers, with site support to be provided by service offices in China. As requested, Yokogawa relied on local personnel and organizations for all DCS hardware, software, and engineering related work throughout the course of this project.

Many meetings were held and there was much intense discussion with BP regarding the requirements for safe and efficient execution of loading and unloading operations. There was good teamwork between Yokogawa Singapore, the EPC company, and BP in China. SCA, a Malaysian firm, was also part of this project team. BP was very satisfied with Yokogawa's flawless fulfillment of its requirements in this project.

The factory acceptance test (FAT) and all integration work was performed by Yokogawa Software Engineering (WUSI) Co., Ltd. in China. A pre-FAT was also conducted for key operations such as the truck loading and logistics. As a result of these preparations, the site acceptance test (SAT) and site commissioning went very smoothly and there were no punchlist items for Yokogawa at the project site. Everything was cleared before the SAT.

For the first time ever, this project linked ProSafe-RS and CENTUM CS 3000 systems on the same V net control network. Compared to Modbus, the response times are much faster. It was a challenge to configure and test this before the FAT.

## Customer Satisfaction

Gong Ning, the Engineering Manager for BP China, says, "Based on our good and long term corporate relationship, we have again selected a Yokogawa solution because it works very well and exceeds our expectations."

Wang Dao, the Maintenance & Engineering Supervisor in the Production Department, says, "The Yokogawa system is very reliable. The well designed operation displays help us smoothly handle operations during each shift."

He goes on to say, "Thanks to that, we have had no interruptions in our daily shipments of LPG by ship and truck. The Yokogawa system has been a key factor in maintaining stable operations."



ProSafe-RS



Wang Dao -  
Maintenance &  
Engineering Supervisor,  
Production Department

### <System Details>

Distributed control system: **CENTUM CS 3000**

Safety instrumented system: **ProSafe-RS**

**(2 engineering workstations; 5 human interface stations)**

**CCTV system**