A Yokogawa Commitment to Industry

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SUCCESS STORY

Trains A-D DCS Retrofit & Instrumentation Upgrade PT Badak Natural Gas Liquefaction, Indonesia

Location: Bontang, East Kalimantan, Indonesia
Order Date: December 1999
Completion: September 2002
Industry: LNG

Background

PT Badak (a subsidiary of Indonesia's National Oil & Gas Company, PERTAMINA) operates one of the largest LNG production complex in the world - having eight LNG process trains, associated utility plants and offsite facilities. The first four trains including the utility plant and offsite facilities (i.e. Module I), were commissioned in 1977 and 1983 respectively. They were being monitored and controlled by panel mounted single loop controllers. In order to enhance the reliability and due to obsolescence of equipment of the Module I plant facilities, an entire revamp / upgrade of the control, safety and the electrical system took place, with Chiyoda Corporation being the prime EPC contractor.

The remaining four trains including the associated utilities and offsite facilities (i.e. Module II) were commissioned in 1989, 1993, 1997 and 1999 and are being monitored and controlled by a Yokogawa control system, the CENTUM. During the past 15 years of operation, the CENTUM system proved to operate without a single shutdown and this high reliability was a key criteria to be selected for this upgrade project.

Another criteria for the selection of Yokogawa as the control system supplier for this project was the capability and experience of cut-over work – moving from the existing panel mounted single loop controllers to the new distributed control system (DCS) with no interruptions to the LNG production and minimal disturbance to plant operation. The cut-over work consists of both cold cut-over during a maintenance shut-down and hot cut-over while the plant and the control system were under normal operation. In both cases, expertise that can only be obtained through actual work experience is mandatory to minimize risks and to achieve smooth and successful project completion. Yokogawa's experiences and capability gained through successfully conducting such cut-over type of projects around the world, was well recognized by the customer.

Project Schedule

Although the project schedule was very tight, the project was completed ahead of schedule without any trouble. This greatly owes to the way of working where PT Badak, Chiyoda and Yokogawa carried out the cut-over work as one integrated team.

- The design, engineering and manufacturing were conducted in a very short time - seven months from kick-off meeting.
- The factory acceptance test including the system integration test with the sub systems was carefully conducted in four months.
- It took only 13 months after the kick-off meeting for the start of the initial cut-over work.

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- The cold and hot cut-over work of 14,810 I/O points was completed in 13 months with no impact to normal plant operation.

Project Scope & Results

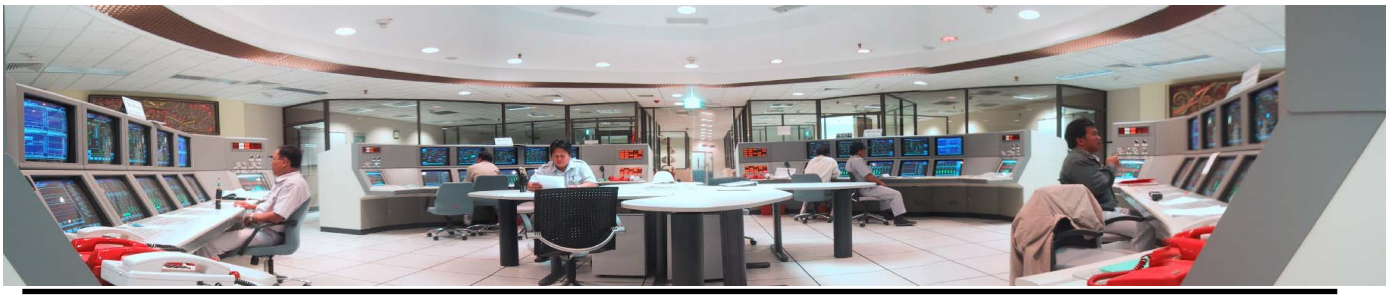
On this project, Yokogawa's scope was not limited to just the supply of the control system and the cut-over work, but also included responsibility for all of the major safety and electrical systems, playing an important role as a system integrator.

Now, all eight trains including the associated utilities and offsite facilities are controlled by the Yokogawa CENTUM, which are integrated into one system consisting of approximately 100 man-machine interfaces and 100 field control stations. As a result of the change from panel mounted single loop controllers to a DCS on Module I, there was an increase in both productivity and efficiency of plant operations.

The results and benefits include:

- An increase of steam production from 6 % - 12% from original max load (total of 11 boilers rated 295t/h per boiler)
- Improvement of boiler response time of 6.7 to 7.9 seconds for 1 ton of steam flow rate change
- A decrease of production down time since the first two trains' cut-over in September 2001
- Allowed a supervisory computer system that enabled process data from all eight trains, utilities and offsite facilities of Module I & II to be acquired and monitored at a single location

We are very proud to have participated in this prestigious project, and are appreciative of PT Badak, the LNG operators and Chiyoda - the EPC contractor - for giving us this opportunity and their strong support throughout this project.



System: DCS (CENTUM), Supervisory Computer System, Anti Surge Control, Vibration & Temperature Monitoring, Hazard Monitoring & Control, SER(Sequence of event recorder), Field Instruments, Analyzer System, ESD/EDP Valves, ESD(Emergency Shutdown System)/EDP(Emergency Depressure System), Electrical Control, UPS, CCTV, Telecommunication, Public Announcement, Fire Suppression System

Total I/O: 14,810

System Configuration: Man-machine Interface x 47, Field Control Station x 49 (Four LNG Process Trains, Associated Utilities, Offsite)

Scope: System integration and cut-over (hot & cold) work