

Saudi Aramco Southern Area Gas Oil Separation Plant Control System Upgrade Project

Saudi Aramco

Location: Saudi Arabia (Abqaiq, Shedgum, Aindar, Uthmaniyah)
Order date: June 1998
Completion: December 2007
Industry: Oil & Gas



About Saudi Aramco and Southern Area

Saudi Aramco's operations span the globe and the energy industry. The world leader in crude oil production, Saudi Aramco also owns and operates an extensive network of refining and distribution facilities, and is responsible for gas processing and transportation installations that fuel Saudi Arabia's industrial sector. An array of international subsidiaries and joint ventures deliver crude oil and refined products to customers worldwide.

The key production region for Saudi Aramco is the Southern Area, which is divided into North Ghawar and South Ghawar. Throughout this region are numerous gas oil separation plants (GOSPs), which provide the initial separation of water and gas from the oil prior to shipment to Abqaiq for further processing.

Background of This Project

In 1997, Saudi Aramco embarked on a program to address the obsolescence of control systems and instrumentation in these Southern Area GOSPs. The program consisted of seven individual projects, which eventually covered 16 GOSPs. In the initial phase of the program, Saudi Aramco invited all approved distributed control system (DCS) vendors to bid on the supply of integrated process control systems for four GOSPs, with an option for five additional systems. Yokogawa Middle East was selected and awarded a blanket purchase agreement for provision of four process control systems, each consisting of a DCS (CENTUM CS 3000), emergency shutdown system (Triconex), vibration monitoring system (Bently Nevada), and field instrumentation.

The first project proved so successful that the option for the five additional systems was exercised, and Saudi Aramco and Yokogawa even extended the purchase agreement to cover the balance of the GOSPs in the program. In addition to the provision of these 16 integrated process control systems, Yokogawa has also supplied a maintenance training system and an operator training system.



Good Guidance and Team Effort

One of the major factors in the successful execution of the GOSP modernization program was the continuous support of Saudi Aramco during all stages of project execution. From the beginning, Saudi Aramco has assigned dedicated senior staff, at times stationed at Yokogawa Middle East, to work as part of the team to ensure the systems provided meet the requirements of Saudi Aramco and the needs of the end users. This team effort extends beyond just Yokogawa and Saudi Aramco. The sub-vendors, most notably Triconex, have also contributed greatly to the success of the program by fully supporting demanding schedules and working with Yokogawa to provide the best in products and services. Yokogawa partnering with Saudi Aramco began under this program, and over the years has culminated in a WIN – WIN scenario for both companies.

What This Project Contributed

Under this program, Yokogawa has been able to:

1. Establish a high quality engineering center in the region.
2. Develop the in-house management expertise necessary to execute Saudi Aramco projects.
3. Develop the in-house engineering core conversant with Saudi Aramco standards and requirements.
4. Gain the reputation and credibility necessary to execute larger projects for Saudi Aramco, with continuous projects from Saudi Aramco.
5. Dramatically increase its installed base in Saudi Aramco facilities.

What's Next?

Having successfully completed the various GOSPs in the Southern Area for Saudi Aramco, Yokogawa recently has been awarded a contract to engineer and supply the entire process control system (PCS) for the main Khurais Central Processing Facility (KhCPF). This is part of the Khurais Crude Increment Program, which is the largest crude increment undertaken in the history of Saudi Aramco and one of the largest industrial projects being executed in the world today. This project is divided into three lump sum turn-keys (LSTKs), Snamprogetti – utility, Hyundai – gas, and Snamprogetti – oil.

With its two newly opened offices in Saudi Arabia, Yokogawa is committed, as usual, to providing a state-of-the art and quality PCS for the KhCPF project, and is looking to strengthen and maintain its long association with Saudi Aramco.



System

System: Fieldbus Control System

Typical System Configuration of one project among total 20 projects:

- CENTUM CS 3000 R3 DCS with field interface I/O (FIO) for FF and HART
- 2 x large full redundant control station (FFCS-L)
- 4 x human interface station (HIS)
- 1 x DCS engineering station
- 1 x Plant Resource Manager

(Real-time device maintenance management & advanced diagnosis package)

- PRM Server
- PRM Client
- PRM Field Communication Server

1 x ExaOPC station for interface to PI

1 x PI station

1 x ESD/CCS engineering station

- 1 x CCS Trilogger station
 - ESD & CCS System by Invensys
 - VMS system by GE

Yokogawa Electric Corporation

YOKOGAWA ELECTRIC CORPORATION
World Headquarters
9-32 Nakagyo 2-chome, Musashino-shi, Tokyo 180-8750, Japan
<http://www.yokogawa.com/>

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