

Reliance Chemical facility achieves “live” upgrade

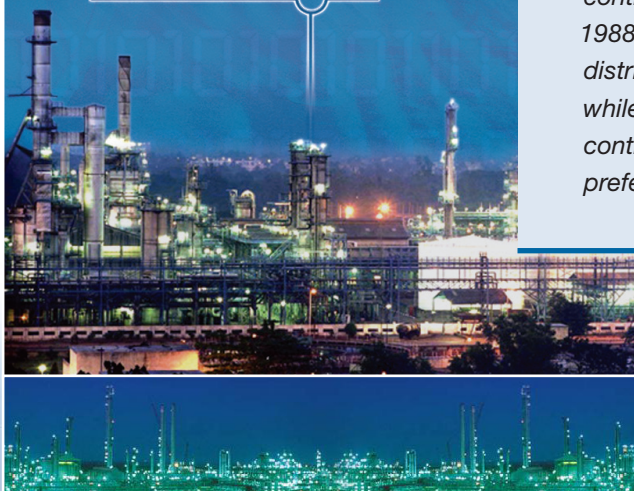
Production maintained during evolution to System 800xA

Project Report



- Operations
- Engineering
- Control & I/O
- Device Management
- Asset Optimization
- Information Management
- Production Management
- Safety
- Applications

The project involved evolving from the facility's original control system, dating from 1988, to a state-of-the-art distributed control system, while maintaining the process control philosophy the plant preferred.



The Reliance Group, founded by Dhirubhai H. Ambani, is India's largest private sector enterprise, with businesses in the energy and materials value chain.

This was Reliance Industries' first experience having one of its facilities evolve its process control system to a more advanced version, and do so while the plant remained in full operation. It required detailed engineering and exceptional understanding of process control logic. ABB met the challenge and the customer's expectations.

The Group's annual revenue is in excess of US\$2 billion. Its "flagship" company, Reliance Industries Limited (RIL), is a Fortune Global 500 Company, and is the largest private sector company in India. The Group's diverse activities span exploration and production of oil and gas, petroleum refining and marketing, petrochemicals (polyester, fiber intermediaries, plastics, and chemicals), textiles and retail.

RIL is India's largest manufacturer of linear alkyl benzene (LAB) with a plant at Patalganga that has an annual output of 110K tons per annum. The facility operates in technical collabora-

tion with UOP (USA), the process licensor. The LAB product produced here is marketed under the trade name "RELAB."

LAB is the basic raw material for detergents. The LAB industry capacity in India is 350K tons per annum. RIL's production therefore represents a significant share of the market. RIL caters to both the large scale and the speciality detergent industry in India.

The LAB plant was commissioned in 1988 and was equipped with ABB MOD30 controllers that were linked to a VAX system. With subsequent de-bottlenecking to increase plant capacity, the control system was expanded to a MOD-300 DCS using ABB Model B and SC controllers. Later, AC460 controllers were added. The complete control system consisted of approximately 1,400 I/O points.

As the Model B and SC controllers became dated and more costly to maintain, RIL decided to upgrade the complete control system with a new generation, state-of-the-art distributed control system.

ABB's System 800xA Extended Automation was selected for the upgrade, with consideration to several factors. One was the fact that it provides a Windows platform, as well highly reliable 800 Series I/O modules. Additionally, it features Open System architecture and OPC compliance. Also, service support is available, and the company is familiar with the 800xA system since one had been installed at RIL's Hazira complex.

The 800xA system installed at the LAB plant at Patalganga, similar to the one at Hazira runs a suite of Industrial IT software for operations, maintenance and management of the asset. The hardware portion of the system has many redundant features that help ensure a high degree of operability. Hardware for the Patalganga facility includes:

- 4 sets of redundant controllers
- Redundant S800 I/O modules
- 2 redundant aspect servers
- 2 redundant connectivity servers
- 1 history server
- 4 operating stations; 2 with dual monitors
- 1 engineering work station
- 1 dedicated workstation for APC communication and IP21 application





It also features a redundant set of Domain controllers on a Windows based server with redundant plant network. Communication protocols include Profibus and Modbus. Optical fiber networks were used to simplify installation.

Need for detailed engineering

Detailed engineering was carried out with an existing control philosophy in mind. The

The transition from the earlier control system to the 800xA system was well planned and went smoothly without a single upset or shutdown of the facility.

RIL LAB plant has different sections to control. The facility is divided into two areas, referred to as the

“Front-End” and the “Back-End”. The integrity of this distinct separation was maintained.

The “Front-End” area is used to produce raw material for the “Back-End” area that produces LAB.

A database was designed for appropriate applications for each area. In all, there are 20 diverse applications for the facility with different task cycles. This has made the 800xA system truly distributed and this architecture helps maintenance engineers to easily identify the loops, tags and the logic of a particular part of the control system.

Logic for the control system was developed using primarily the ABB PCDevice Library which

is recommended by ABB for the chemical industries.

This library provides integrated objects that include control logic as well as faceplates, etc. Enhanced features of the library give operators immediate visibility of interlock status, allowing them to immediately identify which interlock is holding up production.

To meet specific RIL process requirements, a customized library was also prepared and tested. All the application logic was configured and tested to RIL’s satisfaction by simulation before the 800xA system was dispatched to the site.

Evolution from one system to another

The transition from the earlier control system to the 800xA system was well planned and went smoothly without a single upset or shutdown of the facility. It was conducted in two stages.

The Front-End area of the plant was selected for upgrading first. Open loops were transferred, one by one, to the 800xA system over a period of time. Then, complex loops followed, receiving special care.

Once the Front-End area was commissioned, the plant entered an observation phase for six

BENEFITS

- Plant continued operation during upgrade to 800xA
- New system architecture reduced variance in critical loops
- Upgrade minimized the need for operator intervention during changeovers
- Advanced technology provided easier navigation and understanding of the process
- Easy access to information like Standard Operating Procedures and Loop drawings as an aspect for operation and maintenance personnel convenience

months to monitor how well the new system would perform.

Satisfied with its operation, the Back-End area was transferred in similar fashion.

During the period between commissioning the Front-End and Back-End areas, Advanced Process Control (APC) from AspenTech was implemented in the system.

Web server technology demonstration

To meet ever increasing requirements of customers such as RIL, web server technology was demonstrated to show how plant assets can be remotely accessed for predictive maintenance, optimization, and asset management. RIL has expressed an interest in utilizing this technology for remote monitoring of all their plants from their central center for technical excellence.

Customer evaluation

Ranjan Bhattacharya, Vice President of RIL for instrumentation at the Patalganga facility, noted, "This was a unique project for RIL in that it was the first ever implementation of an on-line evolution of one of their petrochemical plant's automation systems."

He further explained, "We have successfully completed the up-grade of the LAB DCS from MOD-300 to ABB's 800xA. We congratulate the ABB team for achieving the objective of the project to our satisfaction."

Mr. Bhattacharya remarked, "As this project progressed, we came across the powerful tools provided by ABB 800xA for process control. RIL always likes to be part of technology enhancement."

Leadership in system evolution

ABB is well recognized in the chemical and pharmaceutical industries for providing an evolutionary path for its customers with an installed base of DCS systems to move to the next level. ABB has gone to great lengths to support customers who want to take advantage of productivity improvements such as those the 800xA system can provide. As seen in this example, it is possible to accomplish an upgrade to the 800xA system "live" or with minimal shutdown to the process.

Please contact ABB Ltd. in India by telephone at +080 22948762, or visit www.abb.com/in



ABB
Process Automation Division
Västerås, Sweden
Phone: +46 (0) 21 32 50 00
Fax: +46 (0) 21 13 78 45
www.abb.com/controlsystems
email: processautomation@se.abb.com

ABB
Process Automation Division
Singapore
Phone: +65 6776 5711
Fax: +65 6778 0222
www.abb.com/controlsystems
email: processautomation@sg.abb.com

ABB
Process Automation Division
Wickliffe, Ohio, USA
Phone: +1 440 585 8500
Fax: +1 440 585 8756
www.abb.com/controlsystems
email: industrialitsolutions@us.abb.com

ABB
Process Automation Division
Mannheim, Germany
Phone: +49 (0) 1805 26 67 76
Fax: +49 (0) 1805 77 63 29
www.abb.de/controlsystems
email: marketing.control-products@de.abb.com