

Success story

## ABB control system upgrade improves hydro plant reliability in India



### Procontrol P13 with a current HMI solution averts total control system replacement.

The Sardar Sarovar hydropower plant on the Narmada River near Navagam, Gujarat is one of India's largest water resource projects, covering the major states of Maharashtra, Madhya Pradesh, Gujarat and Rajasthan.

With a total installed generation capacity of 1,450 MW, Sardar Sarovar provides other benefits to the region, including irrigation, drinking water and flood protection. 250 MW of the total capacity are generated with five Kaplan turbines located in the Canal Head Power House.

In 2010, ABB won an order to upgrade the control system for five of the power plant's generating units located in the Canal

Head Power House. Each unit consists of a Kaplan turbine with 50 MW and uses an ABB Procontrol P13/42 control system "that had been installed in the early 90s through BHEL."

Upgrades included five stations for auto-sequence of the individual units, one common station each for auxiliary control and switch yard monitoring, and a diagnostics station, all connected through an P13/42 intra-plant bus.

This was necessary, because the old HMI system (POSE) was not functional anymore, which made it difficult to monitor and operate the plant. Synchronization was done manually.

For local operations of breakers, isolators and bus couplers, operation engineers had to walk nearly 300 mt to the switchyard area, as the remote P13 station envisaged for this was not in operation since the original commissioning.

ABB engineers conducted a detailed survey of the plant and held detailed discussions with the customer to thoroughly analyze and find solutions to these problems. This helped convince the customer that improving the control system's reliability and availability could be achieved by small parts upgrades using ABB components and solutions, rather than totally replacing the control system as the customer had planned.

Among the many successful upgrades, ABB implemented a new HMI system for the auto sequencer function (single HMI command for startup and shut-down) that operates through the existing P13 system; auto-synchronization with a synchronizing panel common to all five units; and a new engineering/diagnostic station supported by the Progress 3 engineering tool.

The upgraded system now provides an overview of plant engineering, modification and maintenance, a remote view only system, a revived intra-plant bus, a functional switchyard and station auxiliary monitoring and operations system, training for maintenance and operation engineers, improved documentation and a supply of critical spare parts.

The project was completed in July 2011, and the numerous customer benefits include a single integrated platform for plant operations, providing a single window from plant startup to auto-sequencing and auto-synchronizing to grid.

Operation of the plant via HMI is possible for the first time, and Progress 3 with its capability of online monitoring of the functional logic is a substantial enhancement of the P13 control system's diagnostic features. Auto-synchronizing all units using ABB's Synchrotact5 was a huge value addition for smooth plant operation.

This optimized upgrade solution for ABB's Procontrol P13 system has increased control system reliability, eased plant operations, increased plant availability, improved diagnostics and fault finding features, improved online monitoring and simulation, provided trouble-free synchronization, remote status updates, and remote monitoring/operation of station auxiliaries and switchyard with a state-of-the-art HMI.

In addition ABB has also provided the plant with an annual maintenance contract for continuous system services.



The canal head power house of the Sardar Sarovar dam with the five Kaplan turbines.

For more information, please contact:

**ABB Ltd.**  
**Business Unit Power Generation**  
P.O. Box 8131  
8050 Zürich  
SWITZERLAND  
Phone: +41 (0) 43 317-5380  
Fax: +41 (0) 43 317-5382  
E-mail: [PowerGeneration@ch.abb.com](mailto:PowerGeneration@ch.abb.com)  
**[www.abb.com/powergeneration](http://www.abb.com/powergeneration)**