The Ranganadi Hydroelectric Project is a 405 megawatt (MW) generating plant on the Ranganadi River in Arunachal Pradesh, northeastern India. A 68-meter tall dam diverts water south into a 10-km long headrace tunnel, which is then diverted into a 1,062 meter long penstock before it reaches three 135 MW turbines.

The plant is one of five completed hydro generation facilities operated by the state utility, North Eastern Electric Power Corporation Limited (NEEPCO), which currently oversees 1,130 MW of installed capacity. The Ranganadi generation plant uses a Procontrol P13/42 control system to auto sequence the complete operation of three turbines. Operation was enabled completely through the backup panel – there was no HMI (human machine interface) – which created difficulties for operation and maintenance, trip analysis, fault finding, etc, and provided no way to implement preventive maintenance steps.

Ranganadi plant technical array
There are 70 analog and 325 digital I/Os per turbine, and 52 common analog and 122 common digital I/Os for the three units. With respect to the control system, there is one redundant intra-plant bus connecting six stations with a total of seven 70PR05a processor modules – two per unit, and one common to all units. Each unit has an operator station, with one server and one cold standby server, and a KS01 text processor. There are also two EB210 modules per unit, plus two common modules, for a total of eight.

Station 4 interfaces with the microcomputer bus, having the complete family of SK30 modules, and serves as the sequence-of-events recorder, and the PRAUT and SK03 interface. The PRAUT system, however, is nonfunctional today.

Rather than completely revamp the Ranganadi control system with the latest state-of-the-art hardware, NEEPCO listened to
ABB’s assurances that it would support the Procontrol P13/42 control system for the next 15 years at least with spares and lifecycle support. In addition, the ready-made connectivity solution for integrating Procontrol P13 into Symphony Plus, enabled the customer to retain the existing control system hardware while installing the latest state-of-the-art HMI at the same time.

The new Ranganadi HMI system features two Symphony Plus servers (only one operates during runtime; the other remains on cold standby mode) and three operator stations, one for each unit. Together with the latest windows-based engineering and diagnostic solution for Procontrol P13, Progress 3, this enables the operators to completely operate and maintain the plant with all possibilities in fault-finding, trip analysis, and even preventive maintenance.

To enable this comprehensive access to the plant, virtual process control (VPC) engineering was done on site for 204 drives, and ABB provided four customized faceplates for the customer, in order to handle SetPoint/Manual Station functionality, due to non-standard logic usage.

The ABB solution represents a huge cost savings for the customer because it avoids a total control system retrofit, while simultaneously delivering the desired goal of easier maintenance. ABB carried out the HMI implementation during the unit’s planned maintenance outage, avoiding major generation loss. In addition to the cost savings and ease of operation and maintenance, ABB’s solution for the plant reduces downtime and increases efficiency.

For more information, please contact:

**ABB Ltd.**
**Business Unit Power Generation**
P.O. Box 8131
8050 Zurich, Switzerland
Phone: +41 (0) 43 317-5380
Fax: +41 (0) 43 317-5382
E-mail: powergeneration@ch.abb.com
www.abb.com/powergeneration