CASE STUDY – MATAHINA POWER STATION

DETAILS

CUSTOMER	| Trustpower
TYPE	| 2 x 40 MW FRANCIS
NEW/RETROFIT	| RETROFIT
COMPLETION DATE	| MAY 2010

FEATURES

- ✓ Synchronous Condensing
- ✓ Reserves market mode
- ✓ System Frequency Response testing

BACKGROUND

Trustpower's Matahina Power Station consists of two 40 MW Francis turbines. Both were governed by a Mechanical Woodward Cabinet governor. This is one of Trustpower's larger sites providing a big proportion of their total overall hydro power generation.

The old mechanical governors were deteriorating to the point that it took an extended period of time from start to the online state. Maintenance was also becoming difficult. An opportunity was recognised in the station that given its short penstock that the guide vanes could be opened from 0 to 100 % in 4 secs. This made the site perfect for bidding into the New Zealand reserves market. However with the current governors they could not achieve the full financial benefit from this operation.

CHALLENGES

The unique challenges of Trustpower's Matahina Governor Upgrade were:

- ✓ Interfacing with the existing Power Station and Unit Controllers
- ✓ Interfacing into the existing hydraulics
- ✓ Including Synchronous condensing mode
- ✓ Including a custom control to optimise the reserves market by the unit producing 100% output in less than 4 secs.

DESIGNED SOLUTION

A RIVERMASTER Governor DFG-110 was customised for this application. This included all the normal governor functions but also included the additions of synchronous condensing and reserves market mode. The hydraulics were modified by a local engineering company to a design by a Trustpower mechanical engineer. The modified hydraulics interfaced with the RIVERMASTER Governor via a 4-20mA control loop. Most signals were hardwired between the unit controller and the governor. Remote access was required and was achieved via the Ethernet port using Modbus/TCP allowing remote control of the RIVERMASTER governor.

FEATURES

The specific features included:

- ✓ Interfaced into the existing control of the units, overall power station controller and remote control including control back to the Trustpower's remote Operations Centre.
- ✓ Specific custom modes added for synchronous condensing
- ✓ Added an additional algorithm to the governor which in specific circumstances would result in achieving 100% load in less than 4 sec.

RESULTS

Trustpower's Matahina RIVERMASTER Governors have been running trouble free since installation. Trustpower are very happy with the RIVERMASTER governor and its performance and efficiency it has achieved for the station. In addition the reserves market mode has facilitated a financial advantage to Trustpower and added an additional financial stream to the company.

Since installation Trustpower has added an inbuilt efficiency testing function within the RIVERMASTER governor. This is done in conjunction with very accurate flow meters to measure efficiency at differing lake levels and flows allowing the company to maximise their financial gains from the two turbines in the Matahina station.

CONTACT

For more information on this case study please feel free to contact:

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