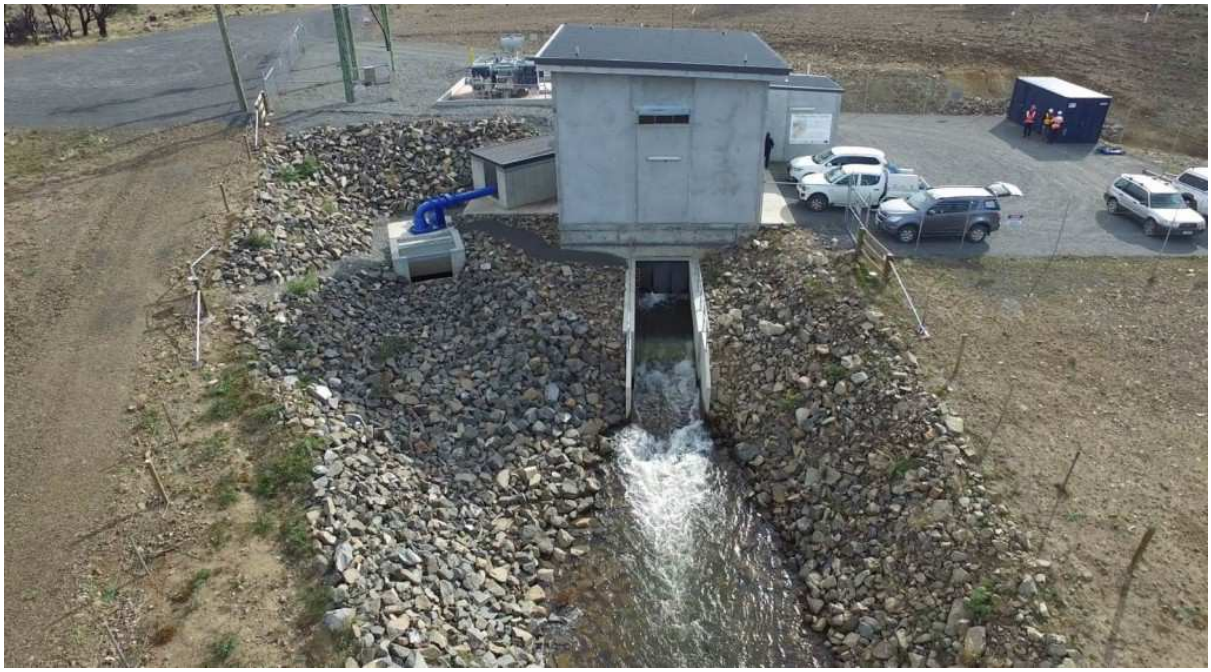
CASE STUDY – MIDLANDS POWER STATION



DETAILS

CUSTOMER	| Tasmanian Irrigation
TYPE	| 6MW PELTON
NEW/RETROFIT	| NEW
COMPLETION DATE	| JULY 2014

FEATURES

- ✓ Speed Control
- ✓ Real/Reactive Power Control
- ✓ Flow Control
- ✓ Isochronous running
- ✓ Deflector speed governing

Background

The Midlands Power station is situated in the centre of Tasmania, Australia. Tasmanian Irrigation (TI), while being an irrigation company, wanted to utilise the potential power of their water source, before delivering the water to its customers.

Challenges

The unique challenges of the TI Midlands Power station were:

- ✓ Very High head
- ✓ Flow control required (with limited flow measurement)
- ✓ Line connection limitations including power and reactive power
- ✓ Isochronous running required to continue to maintain current TI pumping power

Designed Solution

A new turbine was specifically designed by Hydroworks Ltd of New Zealand for Tasmanian Irrigation with the control system being a RIVERMASTER DPC-556 Unit controller which encompasses the RIVERMASTER governor as well as auxiliary power station control functions such as Main inlet valve control, start up and shutdown sequencing as well as Hydraulic Power pack control and monitoring.

The specific features included:

- ✓ Due to the high head and therefore slow rate of the nozzles opening and closing, deflector speed governing had to be introduced to ensure stable operation for both starting and isochronous modes.
- ✓ A flow control algorithm was incorporated using rated turbine design and calculating flow based on pressure and nozzle positions.
- ✓ Reactive and real power limits were introduced to ensure line limits were not exceeded.
- ✓ Monitoring of current pump power requirements so that on a trip to isochronous mode the deflector is able to correctly position and control the speed to maintain pumps and therefore continuous irrigation.

Results

TI's Midlands station has been running trouble free since installation. TI has halved their payback time due to the increased revenue from Midlands Power Station and due in part to the efficiency of the Hydroworks turbine as well as the accuracy of the RIVERMASTER Unit controller maintaining maximum power (up to line restrictions) while still ensuring that pumps continue to run in the event of a trip off the main grid (isochronous running).

TI have since engaged Control Electronics to effect a number of upgrades to Midlands Power Station including additional features to the control system to maximise their revenue stream from the power station.

TI are very happy with the end result and are interested in this model for other areas of their business. This project is the largest irrigation development in Tasmania's history and is a truly outstanding engineering feat, which has been recognised both in Tasmania and nation-wide. The scheme itself also won an Engineering Australia Award, an Earth Award and was a finalist in the National Infrastructure Partnership Awards.

Contact

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