

OVERVIEW

Client	TrustPower Ltd.
Location	Coleridge, New Zealand
Scope	Replacement runner, seals, wicket gate wear plates. Refurbishment of head covers and the turbine shaft
Head	141.5 m
Flow	3.2 m ³ /s
Output	4,400 kW
Commissioning	2008/2009



DESIGN AND MANUFACTURING



Hydroworks was commissioned by TrustPower Ltd to redesign the two 1922 Escher Wyss Francis turbines at Coleridge power station improving their efficiency and service life. The new runners were designed using computational fluid dynamics and the runner stresses were determined by finite element analysis.

TrustPower Ltd then stripped the turbine and sent it to our manufacturing partner, Mace Engineering, for refurbishment.

The turbines were recommissioned after installation and alignment of the refurbished parts.

OPERATION

Comparison of the tailrace of G8 post refurbishment and G9 pre refurbishment, both operating at the same power output of 3,000 kW, shows significant reduction in turbulence indicating improved efficiency.

G8 also shows a weir height of 4.0 and steady versus a G9 weir height of 4.4 and fluctuating between 4.0 and 5.0. This difference in weir heights equates to a reduction in flow of 12% at the same power output.



G8 tailrace after refurbishment



G8 weir height
after refurbishment



G9 weir height
before refurbishment



G9 tailrace before refurbishment