

## PROJECT DATA

# Ramu Power Station Draft Tube Pressure Pulsation Study



### CLIENT

Papua New Guinea Electric Commission

### PROJECT LOCATION

Goroke Province, Papua New Guinea

### DATE OF PROJECT

Late 1998 to November 2003

### SERVICES PROVIDED

- Investigation and conceptual design for phases 1 and 2 of the project

Ramu is an underground power station completed in 1975/76 with space for five hydro units. Five draft tubes complete with flap gates were originally constructed, but only three 17.2 MW 'Litostroj' turbines with 'Koncar' generators were installed. In 1989 the Yonki Dam was constructed, providing a regulated storage facility for the station, and it acts as a settlement basin for river debris. Two Boving turbines rated at 15 MW (and slightly lower head) were installed in 1989-90 utilising the pre-existing spare draft tubes and gates. In 1992 the original three turbines were extensively modified and refurbished by Boving.

The turbine draft tubes discharge into a common tailrace manifold pipe that runs the length of the station parallel to the longitudinal centreline of the five units. This manifold discharges into a single tailrace tunnel that rises to its maximum elevation about 80 metres downstream the station, where a surge shaft is also located. The main tailrace tunnel runs for approximately 2200 metres on a downstream grade and discharges into the old river course.

Hydro Tasmania completed a phase 1 investigation in 1999 into excessive draft tube pressure fluctuations that had caused numerous failures of the turbine draft tube gates since 1992. In 2003 Hydro Tasmania completed a phase 2 consultancy that produced a conceptual design for turbine draft tube gate bolting and replacement runner nose cones, and then produced full detailed design and documentation. In late 2003 Hydro Tasmania was employed to visit Ramu Power Station to oversee the successful installation of the first draft tube gate locking bolt assembly.

LEADERS IN CONSULTABILITY



Head Office  
4 Elizabeth Street  
Hobart, Tasmania 7000  
GPO Box 355, Hobart  
Tasmania 7001, Australia  
PHONE 1300 360 441  
FAX +61 3 6230 5460  
EMAIL  
consulting@hydro.com.au  
Hydro Tasmania is a business  
of the Hydro-Electric Corporation  
[www.hydrotasmaniiconsulting.com.au](http://www.hydrotasmaniiconsulting.com.au)



Hydro Tasmania  
Consulting