

CASE STUDY

MESCO - Kenya, Africa



KEY STATISTICS

Customer: KenGen Ltd

Net Head: 37 metres

Flow: 1396 litres/sec

Turbine type: Gilkes Francis 518G190

Number of Turbines: 1

Original Power (kW): 410

New Power (kW): 456

Dia: 518mm

Date of original Commission: 1930

Date of Order: 2011

Date of Commissioning: July 2013

Speed: 750rpm

Project Commissioned: November 2013

Scope of Supply: 518G190 Horizontal GILKES Francis runner assembly, fitted with hydraulic actuator on the guide vanes.

510kVA – 415v – 750rpm Synchronous Generator;

Draught tube pipework; Main Inlet Valve – DN600-

PN10 Butterfly Valve; Hydraulic Control Module;

Turbine Control Panel; 2000A rated 415V two section standalone switching panel.

CONTACT

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GILKES

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The client (Kengen) approached Gilkes to advise on the refurbishment of a hydro turbine that was installed in 1930. The system had been subjected to a lightning strike causing a fire within the powerhouse. The original turbine had been running well and still had its original runner. The turbine was an overshot machine with an aluminium-bronze runner. The turbine had a mechanical governor and generated 410kW at 3.3kV.

A project engineer was tasked with designing and modernising a new runner assembly and control system to bring the turbine into the 21st century. A site visit was conducted to determine the serviceability of the old equipment. A report was written and issued to the client and insurance company for acceptance.

Due to the size of the machine it was recommended that the voltage be reduced from 3.3kV to 415v. The result in reducing the voltage was a cost saving for the switchgear and generator. The original runner had an efficiency of 82% and was upgraded with a stainless steel assembly that produces 92% efficiency.

The control system now has an electronic governor that governs the machine via the hydraulic actuated guide vanes. It is now a fully automated system that manages the water level in the intake. One requirement from the client was that the new system is to be fully integrated into the existing Scada system. The commissioning engineer worked closely with the client to ensure all signals were fully integrated and the control system can be controlled remotely.

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