Success Story:
WAPLANS Mekaniska Verkstad AB

Market Served
Energy

Eaton Products Used in Upgrade of Swedish Hydroelectric Power Station

Location:
Nälden, Sweden

Segment:
Hydroelectric Power Station

Problem:
Customer wanted to upgrade to a clean and renewable hydroelectric power source.

Solution:
Customer utilized Eaton's newly released Vickers® KBHDG5V-10 two-stage proportional directional valves with onboard electronics.

Results:
Forsse Power Station has been modernized and upgraded.

"Eaton's newly released Vickers® KBHDG5V-10 two-stage proportional directional valves with onboard electronics came just in time for this important water turbine project on Sweden's Ångerman-älven River."

Håkan Erlandsson, Chief Engineer, Hydraul Syd

Background

Eaton and a distributor partner played an important role in the upgrade of a clean and renewable hydroelectric power source in Europe.

The Forsse Power Station, built in 1968, has been modernized with an upgrade of a Kaplan-brand water turbine made by WAPLANS Mekaniska Verkstad AB of Nälden, Sweden.

With an annual capacity of more than 250-gigawatt hours of electrical power, the water turbine features a variety of Eaton products supplied to WAPLANS by Eaton distributor Hydraul Syd of Ystad, Sweden.

Eaton products used in the installation include:

Two newly released Vickers® KBHDG5V-10 two-stage proportional directional valves with onboard electronics (1,200 liters per minute in a 30-bar system) – Used in parallel to control the angle of runner blades.

Vickers KBHDG5V-8 valve equipped with a double-acting stroke limiter and emergency control valves (550 liters per minute in a 140-bar system) – Used to control water inlet (wicket) gates to the turbine.

Vickers PVH 98 and 141 Series piston pumps – Used in tandem to provide the needed hydraulic power for the runner blades and water inlet gates.

Vickers DG3V-3 and DG4V-3 directional control valves and sandwich valves – Used for emergency closing and auxiliary functions.

Vickers slip-in cartridge valves – Used for miscellaneous hydraulic pressure control and logic functions

Vickers watergate breathers – Used for properly maintaining clean, dry air above the oil level in the hydraulic tank.

Challenges

WAPLANS has depended on Hydraul Syd for many years to supply hydraulic system design assistance for its turbines, including the Kaplan turbine models, dubbed the most environmentally friendly in the world, in part because of their reliance on biodegradable hydraulic oil.

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For the Forsse Power Station project, WAPLANS called on Håkan Erlandsson, chief engineer at Hydraul Syd, to supply the layout, assembly and testing of the water turbine's hydraulic system. The job required taking into account the head, water flow, operating conditions and local regulations.

"We specify Eaton products whenever possible in our system designs," Erlandsson says.

"But Eaton did not offer a size 10 proportional valve prior to this year, so I've had to seek out alternative valve sources in the past for similar projects."

Solutions

With the Forsse Power Station project on the drawing board, Erlandsson recalled a product training session conducted by Eaton's Colin Cooper, product manager – Controls Division, who talked about the upcoming release of the KBHDG5V-10 valve.

"I checked with Colin and availability of the size 10 valve came just in time for the project," Erlandsson says. "Colin was very helpful in providing us with prototypes needed for the application."

Results

Following prototype approval, the KBHDG5V-10 valves, along with the other Eaton products, were delivered to Hydraul Syd, which assembled, tested and supplied the complete system solution to the WAPLANS manufacturing facility.

The Eaton product-equipped water turbine was commissioned at the Forsse Power Station and has been operational since fall 2006.

Equipped with Eaton valves and pumps, a WAPLANS water turbine is an important hydroelectric power source at Sweden's Forsse Power Station.

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