Sulori Hydropower Plant in Georgia: Automation with Microl Equipment

Based on an article by Yaroslav Yakymovych in ElektroTEMA newspaper, 2009

In early February 2009, Promenerhiia, a company from Buchach in Ukraine's Ternopil region, put the restored Sulori small hydropower plant in Georgia into operation. The plant's automation system is built with controllers and instruments made by Microl LLC.



About the project

The Sulori plant had been operating since the 1960s, and over the decades its equipment had become worn out and obsolete. The Georgian side, led by Professor Nodar Ugrelidze of Tbilisi Technical University, decided to restore the plant and brought in specialists from the Ternopil region — Promenerhiia (director Oleh Khomytskyi, technical director Petro Lytkovets).

Promenerhiia carried out the most knowledge-intensive part of the work:

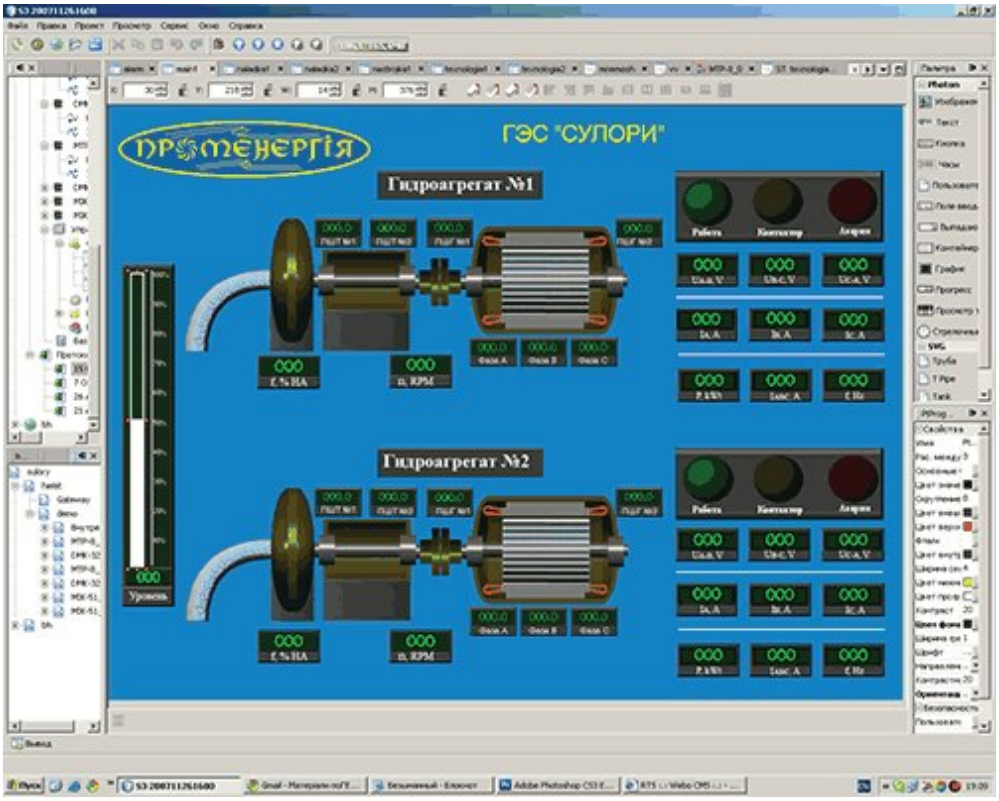
- installed 10 kV high-voltage switching and protection cells;
- installed 630 kVA, 10/0.4 kV step-up transformers;
- supplied 0.4 kV low-voltage switchboards for power switching and automatic excitation control of the induction generator;
- built the automation and emergency power systems;
- supervised installation and carried out commissioning.

Control system

The company developed and implemented a plant monitoring and control system based on the Softlogic S3 SCADA (Real-Time Systems JSC, Dnipropetrovsk). Process monitoring and visualization use MIK-51 controllers and MTR-8 and MTL-32 instruments made by Microl LLC (Ivano-Frankivsk).

The system automatically starts and stops the hydro units, performs emergency shutdown of the plant, and monitors and controls more than 170 parameters, including:

- headwater level (minimum, normal and emergency levels);
- turbine speed (minimum and maximum);
- generator temperature (minimum, maximum and emergency);
- generator electrical parameters (U, I, f, cos φ, S, P, Q);
- interlocks and protections.



Mimic diagram of the Sulori plant in the SCADA system

The guide vanes of the Francis turbine are driven by a DC electromechanical actuator (AC on customer request), which adjusts output according to water flow. Compared with a high-pressure hydraulic system, this electric drive is more reliable, simpler to operate, positions more accurately and is more environmentally friendly.

Key specifications of the Sulori plant

- output — 800 kW (2 × 400 kW);
- head — 21 m;
- water flow — 4.2 m^3/s;
- two 400 kW induction generators;
- horizontal FG-3 hydro turbine.



Hydro turbine of the Sulori plant

Relying on Ukrainian equipment

According to Oleh Khomytskyi, almost all the equipment for the mini hydropower plant in Georgia came from Ukrainian manufacturers: microprocessor controllers, regulators and modules from Microl (Ivano-Frankivsk), turbines from Minihidro of Kharkiv, and generators from the ZKEM plant in Nova Kakhovka. The director of Promenerhiia is convinced that Ukrainian products are as good as their foreign counterparts while costing much less, so choosing domestic manufacturers supports them and helps them grow.

Going forward, the company planned to focus on wind power. In Oleh Khomytskyi's view, there is plenty of work in building and automating small hydropower plants across many regions of Ukraine — and beyond.

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