Upgrading the Station-Wide Control System of the Soyuz CS-21 Compressor Station

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How the I&C Service of the Bohorodchany Line Production Department upgraded the station-wide control system of compressor station CS-21 on the Soyuz gas pipeline in-house, using Microl instruments.

The station-wide automatic control systems of the compressor stations on the Soyuz main gas pipeline were supplied and installed by the German company AEG Kanis in the late 1970s. In their day they were model engineering solutions, but over more than 30 years of operation, as the equipment aged physically and became obsolete, their shortcomings came to light.

What was not monitored

During operation of CS-21 Soyuz it turned out that the station-wide control system did not directly monitor or record a number of important parameters: gas pressure at the outlet of the fuel and starting gas treatment unit, the 110 V and 24 V supply voltages, and gas temperature at the outlet of the air coolers. There was not even an audible or visual alarm for low working gas pressure — and without working gas, the shut-off valves of the station and its gas compressor units are practically uncontrollable.

What was done

- compact PTX 7500 pressure transmitters, Honeywell STG, STD and STA smart pressure transmitters and JUMO humidity and temperature transmitters were installed;
- UA-112 and MTR-8 microprocessor controller-recorders were mounted in the NS-2 main control panel (Fig. 1), and remote monitoring and archiving of all these parameters on a PC were set up;
- air humidity, atmospheric pressure, the antifreeze level in the station-wide tank and the gas temperature at the inlet of each air cooler section were additionally brought to the main control panel;
- the obsolete air cooler outlet gas temperature controllers, together with unreliable DZT timers, were replaced with MIK-51 microprocessor controllers (Fig. 2).



Fig. 1. UA-112 and MTR-8 microprocessor instruments in the NS-2 control panel

The new scheme improved the algorithm for switching the air cooler fans on and off and allowed the fans in both sections to be loaded evenly. The MIK-51 controllers allow quick changes to the "min" and "max" setpoints, the number of the selected fan, the fan on/off time intervals, and the differential and hysteresis of gas temperature control.



Fig. 2. MIK-51 controllers in the gas air cooler control panel

The MTR-8, MIK-51 and UA-112 instruments are connected via RS-485 and RS-232 to the engineer's PC at the main control panel, where the process parameters are displayed and archived by a purpose-built SCADA system (Fig. 3).

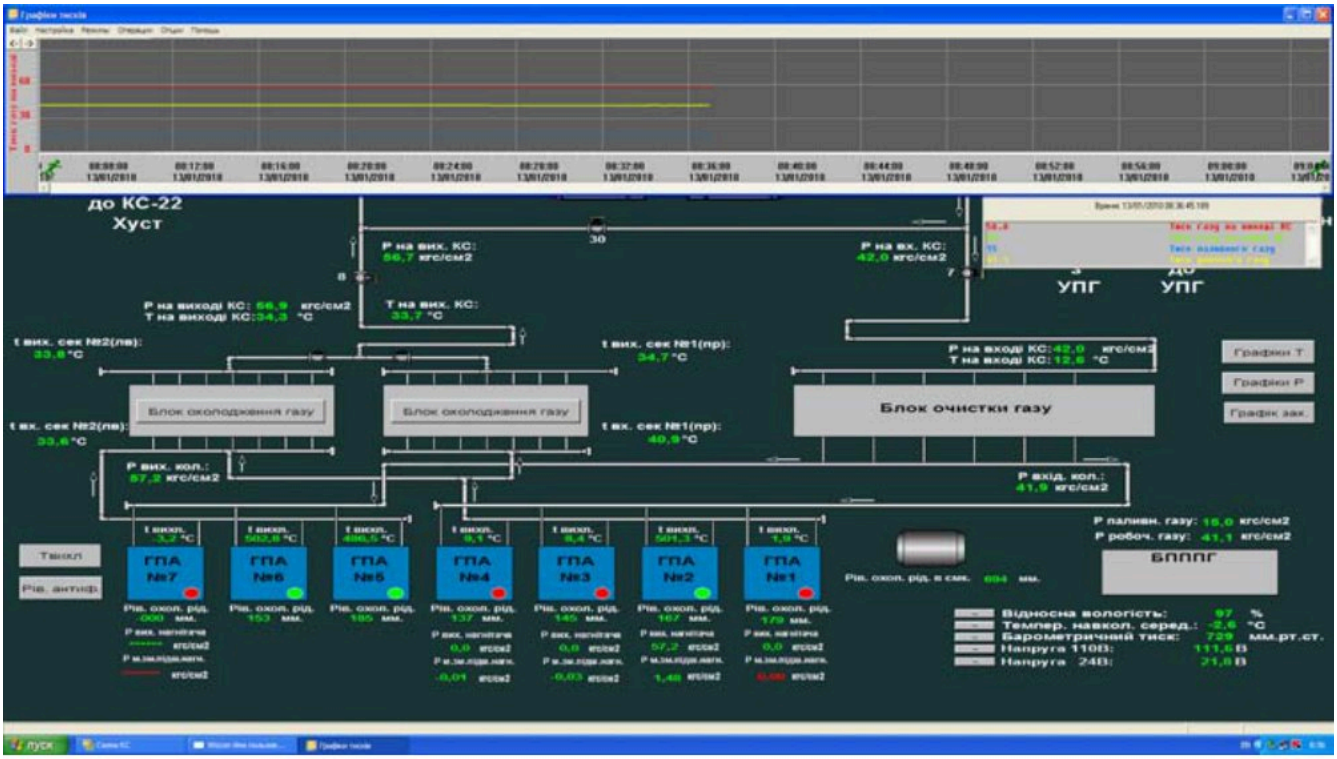


Fig. 3. CS-21 mimic diagram

These improvements and technical solutions by the I&C Service of the Bohorodchany Line Production Department have brought the station-wide control system of CS-21 on the Soyuz main gas pipeline up to modern standards.

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