

STATION MANAGEMENT SYSTEMS

SIPAI Simulation Station

As part of the co-operation activities between ELSTER-AMCO and the Shanghai Institute of Process Automation and Instrumentation (SIPAI) in Shanghai (detailed in ELSTER Profiles 2002/Vol.2), IGA provided a simulation station designed to show the capabilities of the ELSTER-AMCO product range.



The West to East Pipeline is the first high-pressure transmission pipeline in China, and the simulation station gave an opportunity to highlight how, by careful consideration at the design stage, it is possible to increase safety and the security of the downstream supply, whilst also reducing station downtime.

The simulation station, which is operated on clean dry air, is fully working as far as is practical and is designed to demonstrate all major gas measurement, control and conditioning processes associated with City Gate Stations. The result is that it integrates a wide range of key components including AFV high-pressure regulators, ELSTER TRZ Turbine meters, and FLOW COMP GAS-ACE station management system incorporating the F1 flow computer.

The station, which is designed to be as compact as possible, consists of the following:

- ▶ Twin Stream (2 x 100%) Filtration
- ▶ Single Stream (1 x 100%) Turbine Metering complete with bypass
- ▶ Single Stream (1 x 100%) Electric Heating complete with bypass
- ▶ Twin Stream (2 x 100%) Pressure Reduction



To highlight the versatility of the AFV high-pressure regulators, two different types of pressure control were used. One stream utilised a standard two-stage working monitor

control system. In the event of the failure of the main regulator, the monitor regulator takes over.

In the unlikely event that the monitor regulator also fails, a slam shut valve, consisting of an actuated ball valve and the IGA SENSLAM control system, will activate.

On the second stream, remote pressure control utilising the ZSC120 was incorporated. The ZSC120 is a modification of the ZSC100 pilot with the addition of an extra diaphragm. Outlet pressure is applied to one diaphragm and a control pressure signal from a remote control (I to P) to the other. The result of this is that by increasing the control pressure signal the station outlet pressure decreases and vice versa. If for any reason the control pressure signal is lost, the pressure in the remote control chamber will slowly equalise through a safety system to outlet pressure, enabling the station outlet pressure to rise to the maximum profile set point.

Signals from the isolation valves, turbine meter and the various pressure, differential pressure and temperature transmitters are fed to the FLOW COMP panel consisting of a F1 flow computer, a C1 gateway and a GAS-ACE monitoring and control device. The F1 flow computer calculates the standard flow and energy of natural gas and feeds the information back to the SCADA host PC. Meanwhile, the GAS-ACE device monitors the signals and will activate alarms in the event of High or Low Pressure on the station outlet, Low gas temperature on the station inlet, High or Low Pressure on the station inlet and high differential pressure across the filter.

Furthermore, the FLOW COMP panel is also used to simulate various events that could occur in a City gate station. The events simulated are:

- ▶ Odorant Tank Level High/Low
- ▶ Odorant System Collective Failure
- ▶ Heater High Element Temperature
- ▶ Heater High Gas Temperature
- ▶ AC Power Failure

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