



## Networked Blower Control System On-Line

*November 1991* - A state of the art blower control system from ESCOR has gone on-line at the Beloit, Wis. WWTP. The unique system uses a communications network to control discharge pressure and flow for five centrifugal blowers. Combined discharge flow of the blowers is 40,000 SCFM.

The ESCOR package is a true distributed control system. Six separate processors exchange data on a dedicated communications network. Each blower has a local control panel with a processor capable of independent control if the network fails. These panels control blower discharge flow to  $\pm 5\%$  of setpoint.

The sixth processor is a master panel. Using the MS-DOS operating system, it monitors the common discharge header pressure and maintains it to less than 0.1 psi deviation. If the pressure fluctuates, the master panel sends new flow setpoints to each blower's local control panel. Regardless of the mix of blowers running, all are operated at the same percentage of flow range.

The blowers and controls are at the heart of a new wastewater treatment facility that incorporates diffused air activated sludge. The plant performs nitrification and denitrification in addition to BOD<sub>5</sub> removal. The city's consulting engineer was Ch2MHill. ESCOR provided customized control technology to meet their specifications.

Three of the five blowers utilize 4,160 Volt, 600 horsepower motors. The other two units have 400 horsepower motors at 460 Volts. The ESCOR system controls a total of 2,600 installed horsepower. The system was built with provisions for one future blower.

A complete monitoring system is used to provide safety shutdown of the blowers. Monitored parameters include motor winding and motor bearing temperature, blower bearing temperature and blower bearing oil level. The local panels also continuously monitor and display discharge air flow, pressure and temperature. Blower amperage is also input to the system and used for surge and overload control.

Blower flow is controlled by inlet butterfly valves. Each blower also has a blow-off valve for surge control and starting. The blow-offs can be modulated to maintain air flow when the aeration headers are restricted. A special differential pressure switch and check valve system are used to detect loss of flow to the aeration header.

All valves are pneumatically operated, with integral transducers to convert the 4-20 mA signal from the local control panel to 3-15 psi. Both valves are capable of continuous modulation. In addition, the blow-offs have a special "fast open" system to relieve surge within one second of occurrence. The blow-off is then closed, and the blower is automatically brought back on line.

The entire Beloit WWTP is monitored by a PLC system with color graphics computer terminals for operator interface. This system was designed by CH2MHill and monitors virtually every unit process from remote pump stations through solids handling. The ESCOR system interfaces to the PLC I/O system for alarms and data logging. ■

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