

# Clearing the Air With BACnet®

By **Randy Amborn** and **Andrew Wilcox**, Associate Member ASHRAE

When the new Science Laboratory Center at Winona State University in Winona, Minn., was planned, the consulting engineer had a strong preference for a particular brand of lab fume hood system based on past experience with the product. The engineer was concerned that the control interaction of the fume hood system and HVAC/controls maintain proper air balance between fume hood and the laboratory space, especially if lab doors were left open.

Since a building automation system existed throughout the campus that was satisfying his needs, chief engineer Scott Kluver required the fume hood system to integrate with that. While the fume hood system used another open protocol for internal communication, the manufacturer offered a gateway to BACnet over Ethernet. The BACnet pro-

col was the best choice for the fume hood system, and an effective interface with the BAS system.

#### **BACnet Enables Smooth Integration**

Once the fume hood system selection process was completed, the team turned its attention to the installation and commissioning phases of the integration consisting

of 88 fume hoods, 277 devices and 150,000 cfm (70 800 L/s) of total ventilation. Because the fume hood control system was in a new revision, the local controls representative contracted the system setup with the supplier's corporate office.

The integration was accomplished for the Science Laboratory Center's substantial completion in spring 2004, and full occupancy in that fall for classes and research.

#### **BACnet and Fume Hood Operation**

"We wanted to be able to monitor and potentially troubleshoot the fume hood system and control lab space temperature setpoints from our BAS workstation in the physical plant building," said Kluver. High-pressure boilers serving the campus are located there, so state codes require a staff member to be present 24-7 much of the year.

Through the BACnet protocol, the extensive fume hood system and controls were interfaced to the campus' exist-



*Upper left: BACnet enables the integration of 88 laboratory fume hoods, such as this one with the building automation system. Upper right: the Science Laboratory Center opened for classes in fall 2004. Lower left: Facility staff can monitor and control the laboratory fume hood system from a workstation in its control room across campus. Lower right: The fume hood valves and controls are located in a penthouse above the laboratory classrooms.*

ing building automation system where Kluver's staff can view and control a number of parameters:

- Hood total flow/zone;
- General Exhaust Valve (GEX) total flow/zone;
- Makeup air valve (MAV) total flow/zone;
- Total supply flow/zone;
- Total exhaust flow/zone;
- Hood individual flow;
- GEX individual flow;
- MAV individual flow;
- Zone temperature;
- Zone temperature setpoint;

- Local setpoint enable;
- Room flow offset;
- Room flow offset setpoint;
- Emergency override switch status;
- MAV discharge air temperature;
- Percent heating/cooling;
- Jam alarm; and
- Flow alarm.

As with many building owners, Kluver was not an advocate of a given protocol to accomplish the integration. He was only concerned that it work, and not create problems for him and his staff. Operation has been smooth and satisfactory. "Things

have been running well," says Kluver's refrigeration technician Mike Speltz.

### The Future

Looking ahead to the campus' long-term facilities plan, Kluver sees extending the fume hood system and BAS integration to a remodeling of an adjacent building. Pasteur Hall will add 16 additional devices and 99 VAV boxes to the BAS.

*Randy Amborn is the marketing communications manager and Andrew Wilcox is the marketing leader for Trane Global Control Systems in White Bear, Minn. ●*