

BIO-REACTOR MONITORING AND CONTROL SYSTEM SCADA SYSTEM

Client

Pharmaceutical Company

Problem Scope

A pharmaceutical company's researchers were spending too much time tending to their experiments. Manually checking the oxygen, carbon monoxide, nitrogen, temperature, and other parameters every few hours to insure progression of the experiment was causing inefficiency.

Viewpoint's Solution

They needed to upgrade their system to a fully automated preventative monitoring system. The system would routinely monitor and alert the scientists in advance of a failure, reducing waste and freeing them for more valuable design and analysis tasks.

There are three important software components to this application: PLC communication via OPC, Viewpoint's Component Engine which offers ease of configuration, acquisition, and control, and a flexible alarm engine for page and e-mail notification.

This system utilizes RS-232 to Ethernet converters and an OPC client to acquire signals from the bioreactors and log the data to an Access database. The data is then processed, checked for alarm conditions, and viewed. National Instruments' Remote Panel viewing and control technology facilitates off-site monitoring.

Technical Highlights

- OPC Client for PLC communication
- National Instruments' Remote Panel Technology for off-site configuration and viewing
- Microsoft Access database
- Viewpoint's Component Engine for a flexible data acquisition system
- Diverse data acquisition devices: DAQ, RS-232, PLC (OPC)
- Common driver model: drop in drivers, self-aware configuration
- Flexible GUIs with drop in screens
- Easy configuration via Microsoft Excel
- E-mail and page alarm conditions

Challenge

Viewpoint needed to create an extensible system capable of monitoring numerous signals interfaced to multiple bioreactors. Parameters such as temperature, fluid level, O₂, dissolved oxygen, pH, and CO₂ are collected and totaled from the bioreactors. Control of pH and nitrogen levels are configured and set by the PC. Since the experiments run over many days, even weeks, the alarm system must be capable of paging or e-mailing the scientists when a parameter is out of range. The configuration of this system and viewing of data needed to be available from any of a number of computers connected to the network. Also, the data needed to be available for additional processing on other connected networks.

This system was designed so that existing equipment could be used while keeping future improvements in mind. Current test cells use existing PLCs and DAQ cards for data acquisition. Future test cells will take advantage of Compact Fieldpoint flexibility for greater process control.

Results

The remote monitoring allows the researchers to view the progress of the experiments in their offices, or even at home. The preventative alarm monitoring and early notification has allowed the company to save experiments and allowed the scientists to become more productive. The scientists are now spending more time designing and analyzing experiments instead of babysitting them.

