

# Matrix Technologies Helps Amgen Help Others

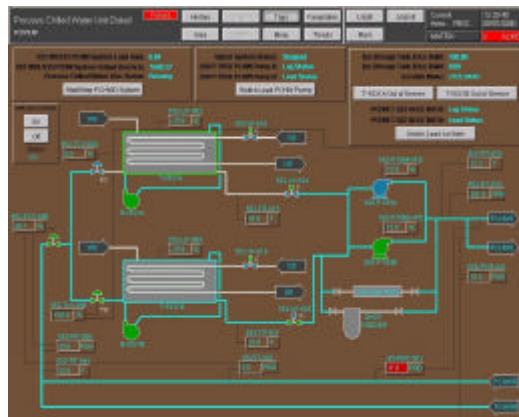
*Move to flexible manufacturing enables quick product changeovers.*

**A**mgen Inc. recently expanded and modified its LakeCentre facility (Boulder, Colo.), using automation and controls to augment quick product changeovers.

The purpose of the expansion was to change the original plant from a clinical manufacturing facility to a campaigned multi-product commercial production facility. The expansion provides Amgen, one of the world's leading biotech companies, with a true "flexible manufacturing" facility for microbial bulk products. Primary goals involved increasing productivity, ensuring flexibility for quick changeover from one product to another, and providing a distributed control system to maximize uptime and facilitate maintenance.

The project included a major building and process area addition and complete control system upgrade; a large part was the control system automation for the expanded production facility. Amgen selected Matrix Technologies Inc. (Toledo, O.), a process engineering, and system integrator, to provide this automation. Amgen's project control system engineer, Chris McDonald, cited Matrix's experience in control system retrofit and expansion projects in the pharmaceutical and food industries. An original central control system (Allen-Bradley PLC 5/80) was replaced with five distributed 5/80C processors to serve the Fermentation, Purification, Buffer and Recovery Preparation, and Buffer Hold areas. Four chromatography skids are controlled by individual skid control systems. A Recovery Suite was added to the facility, and used a separate 5/80C processor with an Ethernet sidecar; another PLC controls utilities. Inter-processor communications are handled via Rockwell's ControlNet. Ethernet Sidecars allow the PLCs to communicate with the five SCADA systems. SCADA systems incorporate Compaq workstations running Intellution Dynamics, with additional supervisory workstations located throughout the facility for supervisory and control purposes.

Inputs and output from the original system were segregated by functional areas, which required a significant amount of fieldwork and rewiring. Wherever possible, existing local junction boxes were reused and retrofitted with Allen-Bradley Flex I/O to maximize use of the existing field wiring. For the Recovery Suite,



*Chilled water process screen.*

three new I/O panels were provided to accommodate the field I/O.

PLC software was completely segregated and rewritten for the existing process areas, and fully developed for the Recovery Suite. Matrix Technologies developed a Functional Specification describing all software functions prior to performing its detailed design and programming activities. The software was developed using S88.01 Batch Control standards. Rockwell's RSLogix programming software was used to develop the ladder logic.

In addition to providing the control system software, hardware, and control panels, Matrix Technologies also provided the installation design package for Amgen's electrical/control system installer. This consisted of all electrical drawings for the project and on-site construction assistance. Amgen and Matrix Technologies used a phased approach to project testing, validation, and commissioning. Prior to shipment, each subsystem was successfully simulated and tested under normal and abnormal conditions at Matrix Technologies' facility, using Cape Software to simulate the process. Once fully tested, a Matrix Technologies' controls team successfully implemented each subsystem at the LakeCentre site.

Critical utilities were first brought on-line, followed sequentially by functional areas carefully choreographed to coincide with the overall needs of Amgen and other members of the project team.

To ensure continuity throughout the implementation process, Matrix Technologies provided on-site commissioning support, led by key members Randy Selis and Greg Pfliegerhaa of the project team involved in the development of the control system.

The control system is fully functional, with cost and scheduling goals successfully met. The expanded LakeCentre operation is due to resume GMP production in January 2001.

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