


Batching Up For Biotechnology

A look at how a sophisticated, recipe-based automation solution was implemented at a Czech biotechnology plant.



Fermentation tank at the Lonza Biotech Kourim plant in the Czech Republic.

Sophisticated automation control systems of batch processes offer many benefits, including flexibility in product selection changes, protected investment into automation, option of production process planning, production technology optimisation, and the possibility to document production.

Biotechnology control belongs to the most sophisticated batch-oriented technology processes. This is the business of **Lonza Biotech Kourim**, which is focused on microbial fermentation and undertakes manufacturing services for the pharmaceutical and biotechnology industries. Lonza Biotech is a part of Lonza Group – a life sciences driven company headquartered in Switzerland.

Recently, Lonza Biotech decided to expand its biotechnology capacities with the construction of a new plant on the existing premises in Kourim in the Czech Republic. Automation control systems form a crucial part of the new technology, centring on Siemens' **Simatic PCS 7** with the fully integrated solution for batch processes, **Simatic BATCH**.

'Exceptional' Project

The project was considered exceptional not only in terms of its extent, but also due to customer requirements, including the compliance with the latest requirements set by the currently valid general manufacturing practice (cGMP) as stipulated by the American FDA.

"During the development and testing of the technology process automation, we had to create more than 200 documents showing that engineering was conducted in accordance with the requirements of the current standard for the development of automation control systems for pharmaceutical industry, GAMP IV, and also serving as documentation of full validation of the solution

implemented," said Vlastimil Braun, Director, Compas automatizace, the system integrator.

Automation Concept

The automation concept is based on Siemens components, in particular on the distributed control system, the Simatic PCS 7. To connect and control sensors and actuators, controllers of the AS 417-4 were used along with PROFIBUS fieldbus with distributed inputs and outputs (I/O), both standard models and those designed for explosive environments (Ex i).

"The new plant's fermentation technology control system for six planned fermentation lines with support operations is fairly extensive and will include about 10,000 I/Os (two lines with 4,500 I/Os will be implemented in the first stage)," explained Mr Braun.

The unified TIA (Totally Integrated Automation)-based automation technology from Siemens also ensures seamless communication with the existing Simatic PCS 7 OSx systems installed in the original part of the plant, as well as technology collaboration with the energy part and other technologies implemented in the existing Kourim plant.

Flexible Control Options

"The batch system must allow automatic, semi-automatic, and manual control regimes that can be switched at any moment of the production flow. This flexibility also includes suspension of a production step (the so-called phase), phase interruption, its completion, or skipping to another phase," Vlastimil Braun concludes.

High quality processing of batch system automation requires a perfect analysis of production steps allowed by the given technology, including all emergency solutions. Compared to continuous processes, the extent of engineering works is several times higher. Furthermore, biotechnologies producing pharmaceutical substances also involve the risk of producing very costly and often hazardous material, which means that the correct production procedure must be ensured.



At the heart of the solution: Simatic PCS 7 controllers.

Information supplied courtesy of Siemens Automation & Drives