System 800xA Enables Incremental Evolution and Plant-wide Optimization

Pharmaceutical giant Bayer upgrades MOD 300 to System 800xA Extended Automation

Project Report

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About Bayer

Bayer is a research-based, growth-oriented, global enterprise with core competencies in the fields of health care, nutrition and high-tech materials. Their products and services are designed to benefit people and improve their quality of life.

In 2005, the Bayer Group in North America (including Bayer Corporation in the US and Bayer Inc. in Canada) achieved total sales from continuing operations of €7.3 billion.

With over 16,200 employees and 55 locations in the United States and Puerto Rico, the U.S. organization is the largest within the Bayer Group. Under the umbrella of Bayer Corporation, the U.S. holding company, Bayer markets the entire spectrum of its portfolio of some 10,000 products from the east to the west coasts.

Scientists and technicians at Bayer Corporation's Berkeley research and manufacturing site produce Kogenate FS, a genetically engineered form of Factor VIII. Kogenate FS provides hemophiliacs with the clotting factor they need to live relatively normal lives.

MOD 300 control evolves to System 800xA

Bayer's Berkeley site (Berkeley), began installing their first MOD 300 control system in 1989.

With Integrated Control Languages, Redundant Communication Network (DCN), History and Reports, Berkeley's MOD 300 investment serves them well. Eventually their installation was expanded to multiple MOD 300 systems. When they realized their need for greater connectivity to the outside world, increased production efficiencies and lower overall operating costs would be supported by evolution of their control system to ABB's latest technology, Berkeley began to enhance their MOD 300 system in incremental steps, to System 800xA Extended Automation.

"The demand for our product is going up," said David Kavanaugh, Process Control Systems Engineer for Bayer's Berkeley site. "We definitely need to increase production. But we also need to document the entire batch process from start to finish to comply with FDA regulations. The ability to track an entire batch process can be automated now, reducing or eliminating manual paperwork. This makes it easier to document or verify that proper procedures were followed."

Production of Kogenate FS is a multi-step process, beginning with the harvesting and preparing of cells for multiplication in the fermentation process. Next is a separation/purification stage. Once purified, the proteins are frozen in bags, and stored until needed. When required, the concentrated, active ingredient is thawed, blended to the proper concentration, portioned, freeze dried into vials and prepared for final packaging and shipment.

Berkeley presently controls their production processes with multiple ABB systems comprised of over 10,000 I/O points in multiple buildings. In 2002, Berkeley began evolving their MOD 300-based control systems to ABB's latest technology in incremental steps – as part of a long-term alliance agreement.

In their new Clinical Manufacturing facility Berkeley installed System 800xA with AC 460 Controllers.

Other systems controlling the process consist of Process Portal and AC 460 controllers. The evolution of these systems to 800xA is under way.

In one large (6,000 I/O point process) Fermentation and Purification building, the evolution was completed in two steps. The HMI was upgraded first, followed by the controllers and I/O. This allowed Bayer to limit their downtime to normally scheduled outages.

In other locations, the controller sub-systems—ABB and third-party—were left in place while HMIs were modernized to provide common front-end connectivity across Bayer's biologics business.

A plant wide consolidation node has been added to tie all historians into one centrally located historian with plantwide access and control data security for utilization of historical data. This will provide comparison of lots for process optimization and product release.

Investment Enhancement through Evolution

"It's actually been exhilarating to see how easy it's been to evolve at our own pace," said Kavanaugh. Bayer was also concerned about their process.

"ABB didn't touch our validated control strategy – how we make our product. They gave us new tools to extract the information out into the operator world and the ability to track an entire batch process automatically – instead of a lot of manual paperwork.

We were able to reuse our control software and existing strategies. We didn't have to re-engineer or extensively re-document our control applications. We reused our Taylor Control Logic sequences and our CCF loops. In some instances, in the earlier evolution stages, we also left controllers completely intact. We just put in a new, easier to operate user interface. That was a big plus because, in the pharmaceutical world, anytime you have to change your control structure, you have to redocument and re-validate. Using ABB's evolution path saved us a lot of time and money."

Why Evolve to System 800xA?

- Enhance control functionality in incremental steps
- Enable remote diagnostic services
- Get product to market more quickly
- Utilize data to establish trending
- Securely integrate third-party products
- Reuse control logic to decrease time and cost of revalidating your process
- Move away from manual paperwork toward fully automated batch tracking and validation processes
- Enable plant-wide optimization – of your control system, servers, memory loops – all assets!

System 800xA offers speed, product quality, trending knowledge

"800xA really provides connectivity down to the process line," Kavanaugh continued. "We're able to bring information in from not just ABB equipment, but also third-party sources, and consolidate it in one place, allowing managers who aren't even on the production floor to view data and see trends. Our product is released quicker and more efficiently, but just as safely as it was before the evolution to 800xA."

Integrating information for improved visibility of process and asset data

800xA Information Manager raises the visibility of data from all functions in the control system. Manufacturers like Bayer can use this information to make better production decisions. Information Manager collects, stores and retrieves historical and process business data from control and related systems and turns it into meaningful information so that the manufacturer can map out a plan to achieve significant KPI (Key Performance Indicator) improvements.

"With Information Manager, we can just take the information in an Excel spreadsheet, do a search for minimums and maximums, and know exactly the high and low point of the temperature, or pH that a batch ran under. That's been a huge time savings."

Many decisions are based on historical data that defines production circumstances for any given batch. Information Manager enables Berkeley to distribute this data out to the plant network. "By getting more information out to more people, we're also likely to see trends that might increase production," says Kavanaugh.

Positioned for future optimization

800xA Asset Optimization enables continuous improvement initiatives such as plant-wide adoption of predictive and proactive maintenance strategies resulting in a higher return on assets.

Asset optimization opens up a whole new world of predictive maintenance for Bayer's Berkeley site.

Kavanaugh again: "We're going to use the paging capabilities. We'll probably branch into the e-mail capabilities, and in the future we're going to tie it in to our maintenance and calibration procedures.

"We want to monitor not just our process assets but also our machines, servers and computers. Everybody thinks of assets as pumps and

valves. We're going to tie those in to our calibration and maintenance system – but it's also nice to know whenever a server's got a problem or its CPU usage is starting to ramp up, or to know the status of a memory loop, or anything like that.

"The asset optimization product ABB offers gives us the ability to look at the health of the whole system, and to make informed, predictive decisions."

Remote Services address resource issues

Kavanaugh's also excited about ABB's Remote Services, which he learned about at the 2006 Automation World Conference & Exhibit; a large-scale ABB event that brings end-users from many industries together to share business insights, ideas and solutions.[1]

ABB's Remote Services extend assistance for a wide range of support needs. From direct, secure system interaction to telephone or self service web support, remote services provide real-time direct access to global technology specialists and service experts 24-hours a day.

"ABB can automatically be notified of problems going on in our system, and this ties in with asset optimization. They'll get notification that we have a problem – even if it's the middle of the night," says Kavanaugh.

"This will allow us to have recommendations, or maybe the solution waiting for us when we get in the next morning. I hope to take advantage of that type of partnership in the future, because ABB definitely has the resources we need. Let's face it – everybody's cutting back on cost and manpower. To be able to have that additional support behind us if we need it, is going to be great."

ABB and Bayer – allies in the future

Kavanaugh spoke about the future of the Bayer Berkeley' site's relationship with ABB. "You have changes to Windows, to hardware, to the process. Bayer is responsible for knowing and understanding changes to the process – that's our job. But I'm hoping to rely on ABB to keep abreast of the other things – to know what software patches I can put in, what hardware changes I might need in the future, to take advantage of new technologies. Because we just have fewer and fewer people to do more and more things. Having a strong alliance with ABB is going to save us time in the future.

"ABB's assistance in keeping our control system strategy intact during this recent system evolution project has made it clear that they care about making it easier for their customers to keep on evolving to where technology is taking us."

[1]There are Automation World events across the globe. The next U.S. Automation World Conference & Exhibit will be held in Orlando, Florida in March, 2007. Check www.abb.com/automationworld for developing news.

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