Success Story

Replacing Old Controls Raises Special Challenges for Specialty Chemicals Providers

Client: McGeen Cleveland
Location: Cleveland, Ohio USA
Product: Symphony Six
Scope of Work: Control system replacement and upgrade

As a computer system becomes obsolete, along with its software, an issue develops as to how to transfer key data in an accurate and timely fashion to a new system. There is also the issue of operator “culture” and what people are used to. This is especially problematic for specialty chemicals providers with their many and varied recipes.

Take McGeen’s operation in Cleveland, Ohio, for example. It maintains an inventory of over 400 recipes for products used primarily by the specialty chemicals and metal finishing industries. The recipes are for production of both organic and inorganic chemicals. Batches range in size from five-gallons to bulk tank trucks, depending on the application. The plant is equipped with 5 reactors and 18 mixer tanks.

In the 1980’s, the Cleveland plant took its growing number of recipes and computerized them using a process control system. It made recipe writing and batch preparation far easier, and helped the operation earn its ISO 9002 certification. Recipes were initiated from a central control room, and run at reactor and other work station locations throughout the plant floor. Portions of the recipes were automated, and certain stages required operator involvement to add or mix chemicals. CRT screen graphics helped direct and guide operators through the process.

Operators and recipe preparation personnel were comfortable with the control system’s logic sequence for recipe building and batch processing.

“It’s very much like you or I would write a recipe,” explained Bryan Shaffer, McGeen’s Cleveland Production Manager. “Basically it is in a text form with straight-forward directions. There is no need to interface with another format to create commands.”
While the process control system was initially successful with its users, the manufacturer decided not to update it, and it became obsolete. Thus, getting spare parts became more challenging each year.

“Parts were not the only problem. We also saw what else was on the market and we wanted those benefits and features for our operation,” said Mark Herbert, McGean’s Cleveland Process Engineer. “Our early control system didn’t have a graphical interface so we had to try to visualize what was happening in the process, whereas later control systems provide a multi-color graphic ‘window on the process.’”

“We also realized the older control system wasn’t so user-friendly in another way, Mr. Herbert noted. “Its I/O and tags were displayed on a board and you had to engage them with toggle switches that had information tags. Literally, writing on the tags. In its day, it was an improvement over how specialty chemical batches were made, but that was then and this is now. And, if for no other reason than lack of parts, we were in the market for something new.

“While we were considering possible replacement control systems, we discovered we had several issues to contend with,” Mr. Herbert explained. “It was quite a learning experience. Basically, we had three issues: 1) What recipe building logic would we use; 2) How could we accurately and safely migrate our many recipes to a new control system; and 3) what would be the ‘cultural’ repercussions of a new control system.”

The McGean Cleveland team working on the control system replacement took a long look at the control system block logic diagram approach for recipes and decided it wasn’t for them.

“It’s been around for awhile, but it wasn’t a good fit for us,” Mr. Herbert noted. “To first create a block diagram you have to basically explain what you want to build. The text approach of the earlier control system was essentially an explanation of the recipe. Translating that into blocks just seemed to us to be extra work.” Plus, there was the problem of the blocks being appropriate for the process you’re designing. You needed ‘fixes’.”

When it came to migrating recipes to a new control system, it made the block diagram issue even more pronounced. It would be time consuming considering the number of recipes now in use. Each recipe would have to be redone.

The last issue had to do with the comfort level of the employees. While they recognized that the newer control systems offered a number of advantages, the older system’s recipe handling approach was much admired.

Criteria for New System

- It should mimic the old system’s recipe creation and processing characteristics
- It should allow existing recipes to be migrated to the new software with a minimum amount of rework
- The panel used with the old system would be replaced with electronic I/O tagging
- It should provide a graphic display “window on the process”
- Potential obsolescence would be addressed to ensure the longevity of the new system

The system selected to meet the criteria was Symphony Six available from ABB, which is widely used in batch applications, including pharmaceuticals. A compact, distributed control system, Symphony Six would be configured to handle some 1,100 I/O points at the McGean Cleveland operation and be installed in the same control room that was occupied by the earlier system.

While the old system was removed and the new one installed during a scheduled inventory break in 1999, the old system’s key attribute remained. Recipes could be entered in text form using ABB’s batch management software. Moreover, about 90% of the recipes were retrieved from the old system and migrated to the new one using ABB’s software.

Like the new control room workstation, the new satellite work stations on the production floor were equipped with graphics depicting the process in action. Like the old system, the key steps in the production process were given, including those calling for manual operation.

Besides handling ongoing processes, Symphony Six provides several types of displays used for production improvement. These include trend displays, spreadsheet displays, system status display, alarm review, event review, and event Historian, among others. Depending upon plant needs, the system can be expanded to include the control of additional production equipment.

The obsolescence concern was also addressed. Symphony Six architecture allows it to incorporate the functionality of later generation components, and a service is provided to migrate the system to an advanced platform, so obsolescence in terms of interoperability can be avoided.