



# Cerestar USA, Inc.

## Designed for Success

### Results

- Decreased labor and downtime costs
- Greater productivity
- Less maintenance with faster troubleshooting
- Easy upgrade program for substantially reduced costs
- Centralized control room for plant-wide system management

*"In the areas we've upgraded so far, we've virtually eliminated troubleshooting. If a piece of equipment shuts down, a quick glance at one of our CIMPLICITY screens tells us exactly where to go to get things moving again."*

**Kennen Howell**  
Maintenance and Engineering Manager  
Cerestar USA, Inc.

## Corn Syrup Producer Cerestar Enjoys Sweet Rewards of GE Fanuc e-Manufacturing Solution

They do things big in Texas. And, Cerestar USA, Inc., a producer of high-fructose corn syrup located in Dimmitt, Texas, is no exception. After enjoying more than 15 years of reliable PLC performance, Cerestar decided to take a big next step and implement an e-manufacturing solution, upgrading its automation systems in order to reduce labor and downtime costs, reduce troubleshooting, and improve performance.

With the help of Brandon & Clark, a design and integration firm based in Lubbock, Texas, Cerestar implemented automation software tools, installed an Ethernet backbone to speed communications, and upgraded its programmable controllers—without interrupting production—through GE Fanuc's Next Step trade in/trade up program. The program helps users of older GE Fanuc Series Five™ and Series Six™ PLCs to upgrade to faster, more flexible Series 90™ PLCs while taking advantage of other GE Fanuc automation products and services. As a result, Cerestar upgraded its control system, protected its original PLC investment, substantially saved on new equipment costs, and has cut equipment downtime and control-room labor costs.

### The Ears Have It

While most of us think of corn syrup as the staple sweetener in our soft drinks and other sugary goodies, Cerestar knows it can be one sticky business. In the mid-1970s, just as high-fructose corn syrup production technology was being introduced, Cerestar began a \$30-million expansion that included the construction of a modern automated corn-syrup refinery specifically designed for



imagination at work

42-percent high-fructose corn syrup. A second expansion in 1981 added production for 55-percent syrup, and a third completed in 1990 further increased the plant's grind capacity.



Today, the Cerestar process begins in the millhouse, where the corn is separated into starch and other lesser components. After soaking or steeping the corn to remove the soluble portion, the corn is processed through a series of mills, screens, separators, and dryers to remove any remaining by-products that are generally used for cattle feed. Once separated, the corn starch portion is pumped to Cerestar's two refineries for 42-percent and 55-percent high fructose syrup production.

The 42 Refinery, which will feature two Series 90-70 PLCs when the upgrade is completed, treats the starch slurry with enzymes that reduce the starch to dextrose, a bland sugar. The dextrose is then converted into the sweeter fructose, which is comparable in taste to the sugar produced from beets or cane. Using the 42-percent syrup, the 55 Refinery increases the concentration using ion-exclusion technology. Finally, both products are pumped into rail cars and shipped for use by soft-drink, fruit-drink, and soup companies, as well as bakeries and creameries.

#### **Pouring on the Power**

Before the current upgrade, Cerestar controlled three of its four processing areas from separate control rooms, which placed an ever-increasing burden on personnel with regard to troubleshooting, information sharing, and communication in general. While Cerestar could have upgraded its PLCs without consolidating their control rooms, plant operators would have continued to struggle with communications.

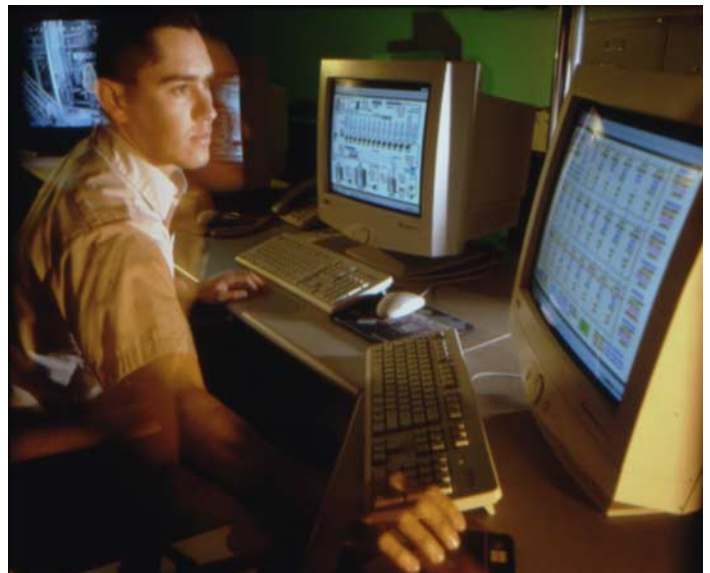
"Adding GE Fanuc's CIMPLICITY®\* automation software was a perfect fit for our data-collection and analysis needs," recalls Kennen Howell, Cerestar maintenance and engineering manager. "With all the power the upgraded PLCs offer in terms of speed and I/O communications, it was only natural for

\* Part of Proficy Intelligent Production Solutions from GE Fanuc.

us to take that power and apply it to a broader control and networking solution. We also knew an Ethernet backbone would give us the speed and reliability we sought, as well as the option to expand into higher level systems in the future."

Currently monitoring approximately 6,100 I/O points, the Windows®-based CIMPLICITY software extends the functionality of the new PLCs and Genius® I/O blocks by providing a graphical interface with real-time monitoring and control capabilities, including database tools that log information and compile reports for all of Cerestar's process equipment, such as boilers, furnaces, storage tanks, and air compressors. The software's manufacturing control features also allow operators to make equipment adjustments like starting and stopping motors and conveyors and opening and closing valves. And, because of the software's object-oriented approach, Cerestar can create screens to handle any number of operating parameters, ranging in complexity from simple status screens and alarm reports to more complex screens displaying diagnostics and analysis of the starch as it progresses through the conversion process.

Operators can also use the software interface to visually track capacity and temperature in tanks and rail cars, promptly handle any irregularities in distribution, and equalize load levels. For example, when the syrup is pumped from storage tanks into rail cars, the Genius I/O reports all information regarding the load-out process to the Series 90-30 PLCs, which send the data to CIMPLICITY. To date, Cerestar has built 25 graphical interface screens into the system with plans to add about 25 more.



Cerestar's new centrally located control room comprises five CIMPLICITY workstations. Two more will be added as the project progresses, with one dedicated to the 42 Refinery and one dedicated to the load-out area. Once complete, Cerestar anticipates the control room will reduce labor costs by consolidating supervisory tasks. Whereas, the previous multiple control room layout required ten operators per shift, one control room will only require eight, which will allow Cerestar to focus the additional personnel on other productivity-boosting functions.

In addition to process monitor and control functions, Cerestar has also begun implementing the CIMPLICITY software's trending tool, which will further

enhance maintenance and troubleshooting by analyzing the historical data of equipment and predicting maintenance needs and performance issues. A new Quality Control room will be built next to the new control room, providing convenient data entry and access to the information.

#### Upgrading without Downtime

Cerestar is also in the midst of swapping out the older PLCs for the new ones—a task the company decided to perform without stopping production. As the upgrade proceeds, each automated area of Cerestar's operation will be outfitted with a Series 90 PLC supported by Genius I/O blocks that feed I/O data to the CIMPLICITY workstations via a dedicated Ethernet network. Each new PLC features a VME backplane with a power supply and CPU that permits continued operation if the Ethernet LAN should fail. A Genius bus controller in the card rack communicates remotely with the Genius I/O blocks, which are wired directly to a sensor or actuator.



Cerestar added GE Fanuc Genius I/O blocks to its control system during the 1989 expansion and has continued to add the blocks as I/O needs have grown. To date, Cerestar has installed approximately 100 Genius blocks dedicated solely to the Series 90 PLCs, with more blocks being added weekly.

According to Bill McMillon, Cerestar's electrical maintenance supervisor, the Genius blocks have significantly reduced wiring and proved extremely flexible and easy to troubleshoot. Because each I/O module is equipped with a CPU, it can accept input from switches and sensors and generate output to control machines and processes without relying on the processing power of the central PLC. Thus, they can act as stand-alone devices, able to carry out normal functions, and keep the machinery operational if the central system fails. They also have the capacity for self-diagnostics down to the sensor level and can generate fault reports on open wire, short circuit, under and over range, and wiring error.

#### Troubleshooting Down, Productivity Up

As Cerestar continues to upgrade its systems, early results are promising. "In the areas we've upgraded so far, we've virtually eliminated troubleshooting," explains Howell. "If a piece of equipment shuts down, a quick glance at one of our CIMPLICITY screens tells us exactly where to go to get things moving again."

"Each component of the new system is incredibly easy to program," adds McMillon. "Our programmers were able to handle the system—the PLC, I/O blocks, and software—after only three days of training. It's just that easy."

What's more, upgrading its installed base of PLCs and I/O, and implementing the new e-manufacturing system positions Cerestar for another ten years of productivity gains and labor and downtime cost savings, while providing a technology platform for easier upgrades and enhancements for plant expansions in the future.

#### GE Fanuc Automation Information Centers

USA and the Americas:  
1- 800-GE FANUC  
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Europe, Middle East and Africa:  
(352) 727979-1

Asia Pacific:  
86-21-3222-4555

#### Additional Resources

For more information, please visit the GE Fanuc web site at:

[www.gefanuc.com](http://www.gefanuc.com)

