



NCERC and Siemens Team Up to Train Next Generation of Ethanol Plant Operators

The National Corn-to-Ethanol Research Center at Southern Illinois University Edwardsville, is the only organization in the world to offer both biofuels classroom training and hands-on instruction. The training includes year-long internships, seminars, five-day process training sessions and training for executives who run the plants. The centerpiece of the training is a SIMATIC® PCS 7 distributed control system donated by Siemens Energy & Automation, Inc. The 10-year partnership between the NCERC and Siemens represents hundreds of thousands of dollars in equipment, software and on-site simulation training.

According to John Caupert graduates of the National Corn-to-Ethanol Research Center (NCERC) can pick and choose their jobs at ethanol biorefineries from coast to coast.

Caupert, director of the NCERC, asserts that people from all walks of life – from GEDs to PhDs – come to the center each year for best-in-class, cutting edge technology training. He says the students learn the newest and most efficient ways to convert grain-based feedstock to ethanol.

Opened in 2003 at Southern Illinois University Edwardsville, the 35,000 square-foot NCERC is the only research center of its kind in the world. The center facilitates the commercialization of new technologies for producing ethanol more effectively,

resulting in improved yields and reduction in costs. It also plays a key role in filling the growing need for qualified personnel to operate and manage biofuel refineries across the country.

While there is a growing demand for new workers in the alternative fuels industry, Caupert says, there is a lack of qualified people to run the facilities. There are 143 ethanol plants in operation in the United States and approximately 57 new plants under construction according to the Renewable Fuels Association.

The rapid growth of this industry was more than anyone could have ever predicted," Caupert says. "The industry just grew more rapidly than the ability to train the people to fill those positions."

Process Automation Systems

Answers for industry.

SIEMENS



The push to reduce the U.S. dependence on foreign oil is the catalyst for the meteoric growth, Caupert explains. He points to the Energy Independence and Security Act (HR6) of 2007 that calls for 36 billion gallons of renewable fuels by 2022. This represents a five-fold increase in the amount of renewable fuels in the United States over the next 15 years.

State-of-the-Art

The NCERC is the only organization in the world to offer both biofuels classroom training and hands-on instruction. The training includes year-long internships, seminars, five-day process training sessions and training for executives who run the plants.

The centerpiece of the training is a SIMATIC® PCS 7 distributed control system donated by Siemens Energy & Automation, Inc. Beginning in 2006, the 10-year partnership between the NCERC and Siemens represents hundreds of thousands

of dollars in equipment, software and on-site simulation training. Caupert says this partnership helps ethanol plant owners minimize risk by producing students with a real-world, technical understanding of how a plant operates.

Steve Ward is a research engineer at the NCERC. He says when the plant opened in 2003 the original control system was chosen based on the lowest bid and well before the plant was commissioned. He recalls that by the time the plant was commissioned, the control system was already outdated with limited support from the vendor. In 2006, the NCERC decided a change was in order.

“We wanted a state-of-the-art control system that was representative of the industry,” Ward recalls. “Responsible for the control system, the biggest thing I was looking for was better support. Now we never have any trouble getting help when we need it.”

Ward and Siemens engineers began software development on the PCS 7 system in September 2006. They worked together to engineer the system and accommodate new equipment at the plant. Additionally, Ward was able to retain the existing 1,300 I/O points, drives, pumps and PROFIBUS PA-based instrumentation and install new Siemens Sitrans P and DP differential pressure transmitters, radar level units, valve positioners, and mass flowmeters.

“It was a seamless transition when we re-commissioned the plant in 2007,” Ward says. “We just unhooked the existing computer and controller and switched over to the Siemens computer and controller. We were able to communicate with most of the equipment at the plant in minutes.”

Real World Experience

Caupert says another reason the NCERC decided to install the PCS 7 system was to give students real world experience running an ethanol plant. "Siemens equipment is installed in the majority of the dry grind ethanol plants in the United States; so when the students leave here there is a good chance they will be familiar with the controls equipment that they encounter in their plants."

Students train on the control system in the plant's control room. Ward says the easy to understand PCS 7 screens help the students quickly grasp the ins and outs of controlling and monitoring all plant operations.

"The system is so simple that the students can teach themselves," Ward says. "The online trending is one of most beneficial tools. We are able to pick up historical trends on the fly dating back a year or more. We can analyze what we have done in the past to help troubleshoot as well as access all real-time critical control data. The students can look at the whole picture over the past few days or go back even further and see how things were operating."

Students also are trained to work with the extensive alarm capabilities of the system. Ward says the PCS 7 system allowed him to set alarms for the most critical process variables. Students can pull up a trend and view any changes within the data points and establish alarm levels and control.

Additionally, Ward says the PROFIBUS platform is a great open standard and it is easy to configure. Using the built-in system capabilities he is able to pull up diagnostic information from the instrumentation that helps improve the maintenance capabilities of the system.

"We have a lot of instrumentation in the plant measuring liquid flow throughout the system," Ward says. "In the past, we would have to go around on an hourly basis with a clip board writing numbers down. It took a lot of time. We depend on those numbers to report to our clients whenever we run trials for them. By using PROFIBUS technology, we get all this data instantaneously from the DCS. This has saved time and reduced error down to almost nothing."

Graduates Go to Work

Recently, 20 people hired by the newly constructed Center Ethanol plant in Sauget, Ill., completed training courses at the NCERC. Plant Manager Tony Newton says the training was essential for the employees to be able to effectively process approximately 19.2 million barrels of corn and produce 54 million gallons of ethanol annually when the plant opens. The plant will also produce 172,000 tons of dry distillers grain.

Newton had to hire people from other industries to staff the new plant. He says the NCERC was a great resource and the logical place to start.

"I knew the center offered a one-week training program to train displaced auto workers and we built another two weeks of training on top of that just to go into more detail," Newton says. "It is amazing how much you learn about the industry, processes, chemistry and maintenance techniques in the first week. We also developed a separate program with the center for lab technicians."

During the three weeks, the students spent 25 percent of their time operating the pilot plant with the PCS 7 system. Newton says none of the employees had previous experience with a distributed control system, so ease of use was important.

"It was a great tool for learning how to operate the process as well as better understanding of data collection and safety interlocks," Newton says. "The employees really liked the system and said it was well designed. Information flows from screen to screen and is easy to understand. It was also easy to comprehend how the different characteristics of the process were controlled."

Newton says the trending capability of the PCS 7 system will be key to the success of the plant. He says operators will have at least one month of historical data available instantly that can be loaded into an Excel spreadsheet, eliminating the need for time consuming manual data entries. He says the employees worked with trending data at the NCERC covering an entire year.





"If it was not for the NCERC, we would have had to train them in house," Newton says. "It would have been a tremendous amount of work and the training would not have been as thorough if we did it ourselves. The guys would definitely not be as ready as they are now to start up the plant."

Partnership for the Future

Caupert says the future for ethanol and other alternative fuels is bright. And, because the Siemens control system is expandable, it will enable Caupert to implement the latest technology to keep

students on the leading edge. Current plans include adding Siemens advanced process control to better use production assets. The center also plans to add smart motor control center capabilities that will decrease installation and commissioning times and increase product diagnostics.

For every job that is created in a biofuels production plant there are 10 additional supporting jobs that are being created outside the plant.

"These are high tech, high paying jobs, but there is a shortage of qualified personnel," Caupert says. "That is where this

partnership between NCERC and Siemens is helping to fill a void. Our graduates say they never would have been qualified for the position they were offered if they had not had the training at NCERC."

"If a person comes out of college with a chemical engineering degree, that person is just one of many applicants standing in a long line for a job offer that never comes their way," Caupert continued. "Our partnership with Siemens is a big reason that a 23-year-old person with an undergraduate degree and one year of training at the NCERC goes to the front of that applicant line."

Siemens Energy & Automation, Inc.

3333 Old Milton Parkway
Alpharetta, GA 30005
1-800-964-4114

info.sea@siemens.com

www.sea.siemens.com/process

Order No.: PAFL-00100-0608
All rights reserved
Printed in USA
© 2008 Siemens Energy & Automation, Inc.

The information provided in this brochure contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

All product designations may be trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes could violate the rights of the owners.