Tereos Sugar: Intelligent and sustainable refining using PlantPAx Process Automation System

Leading sugar producer replaces legacy DCS with PlantPAx to obtain and integrate boiler control for vital operations

Solutions
A Rockwell Automation solution was installed, which included:

PlantPAx Process Automation System
• The solution, based on the Logix Control Platform with Control Logix PAC, replaced an outdated DCS and provides a flexible process control system with excellent reliability
• New I/O platform eases system upgrades

Services
• Turnkey project approach managed by Global Solutions team

Results
• Boiler control has been improved, in particular in terms of monitoring reheating; it has been possible to link the boilers together, and power matching is now carried out automatically
• Increased reliability of boiler operations
• The boiler control and command system is now totally integrated with the other factory units, allowing traceability to be centralised for the entire production site.

Background
Tereos France is a leading company in the French sugar industry with nine sugar factories, five distilleries and four packaging facilities, producing an annual total of 1.5 million tonnes of sugar and 500,000 cubic metres of alcohol and bioethanol from beet.

Each year the Tereos Boiry Sainte Rictrude sugar factory, located near Arras (in the region of Pas de Calais), produces 250,000 tonnes of white sugar for manufacturers in the agro-industrial sector (drinks, chocolate, jam, biscuit and dairy product manufacturers). This sugar is produced over a very short period, known as the "sugar campaign", which runs from mid-September to December each year, during which time the sugar beet is harvested and transported to the sugar factory for processing.

Every day during the campaign, Boiry processes 20,000 tonnes of beet, produces 2,800 tonnes of sugar and consumes 15MW of electricity! The sugar factory produces this energy itself, by means of two boilers that supply a turbo-generator with steam. The factory is connected to the national electricity grid (EDF) only at start-up and outside the campaign period.
Challenge

These boilers are the very lifeblood of the sugar factory, and can produce up to 140 and 120 tonnes of steam per hour respectively. 85% of this steam is used to produce electricity; the remaining 15% is used for the various processes in the manufacture of sugar. In 2009, Tereos decided to replace the now obsolete distributed control system which governed the two boilers.

Tereos’ objective: to modernise and optimise control of these boilers and integrate these within a single control and command system for the whole factory. The company contacted a number of suppliers and, after examining the proposals, chose to migrate command of the boilers to the Rockwell Automation PlantPAx system.

The decision was taken in March 2009...with the sugar campaign due to start in September! This presented quite a challenge for Rockwell Automation, since the factory cannot operate without a boiler. Furthermore, boiler control requires very specific expertise: highly complex regulation algorithms, fine tuning of the burners and extremely sophisticated calculations to anticipate load demand.

Solution

Helping to ensure that this migration took place with minimal risk and within the deadline therefore required specific and diverse skills. This is where Rockwell Automation Global Solutions came in. Its specific knowledge of boiler management and experience in risk management were indispensable in this situation. The Rockwell Automation Global Solutions team carried out a retrospective analysis of the legacy system and defined a migration solution that was able to provide optimal boiler operation with minimal risk.

This solution centres round the PlantPAx process automation system, based on three redundant Allen-Bradley® ControlLogix® PACs and completely integrated into the factory’s overall system. The boiler management specialists from Rockwell Automation adjusted the settings and sequential automation processes that were necessary for control and command of the combustion.

At the end of August 2009, just before the campaign was to start, the factory conducted a week-long “dry run”, during which teams from the sugar factory and the Rockwell Automation team carried out adjustments and tested the loads. The final adjustments of the system could be made only at production start-up, and there was no room for error.

The first day of the campaign went without a hitch, and the increase in power was as predicted. Michel Hennebique, Manager of Electricity - Automation at the Boiry sugar factory gave his confirmation: “The start-up and commissioning of the boiler under Rockwell
Automation went very well; in under two days all the adjustments had been made. And there wasn’t a single stoppage throughout the entire campaign."

Results
With two sugar campaigns now completed, Tereos is in a position to benefit from the improvements generated by the Rockwell Automation solution. And the Rockwell Automation Global Solutions team with PlantPAx system has proved its ability to replace the conventional DCS solution as well as its competitiveness as a solution of this type.

"Boiler control has been improved, in particular in terms of monitoring reheating; boiler output now reaches 96%. Boiler operation is also much more reliable than before. With the Rockwell Automation solution, it has also been possible to link the boilers together, and power matching is now carried out automatically by the PlantPAx system. The skill and unfailing support from the Rockwell Automation team throughout the project made all the difference," states the Boiry Manager of Electricity & Automation.

The boiler control and command system is now totally integrated with the other factory units, allowing traceability to be centralised for the entire production site: alarms, operator actions and process history. "We took advantage of this migration to carry out a review of the ergonomics of our supervision workstations with Rockwell Automation, and our operators particularly appreciate the increased user-friendliness of the PlantPAx system," added the Boiry Automation team.

Most manufacturing procedures at the Boiry Sainte Rictrude sugar factory - diffusion, purification, crystallisation - are now automated using the solution from Rockwell Automation. Two workshops (washing and filtration) will also be controlled by Rockwell Automation as from 2012. The sugar factory constitutes a benchmark site for the Tereos Group.

But Hennebique does not intend to stop there. He already has plans for the implementation of specific Rockwell Automation software to make savings on his energy consumption, and for the use of FactoryTalk AssetCentre - traceability software to monitor all the modifications carried out in the sugar factory’s operational processes.

Additional Information
www.rockwellautomation.fr

The results mentioned above are specific to Tereos’ use of Rockwell Automation products and services in conjunction with other products. Specific results may vary for other customers.