Success Story

Food & Beverage

IndustrialSQL Server, InTouch, InTrack, DT Analyst

Wonderware Plant Intelligence Solution Helps Arla Foods Deliver Fresh Milk Products to the Tables of Europe

"The Wonderware plant intelligence system gives us the information we need when we need it. In essence, it supports our vision of the future."

Jørgen Greve
Plant Manager

Christiansfeld, DENMARK — Have you ever bought a carton of milk, only to return home from the grocery store and find it's not fresh? Arla Foods, the largest dairy company in Europe, is using a plant intelligence solution from Wonderware, a business unit of Invensys Systems, Inc., to prevent this from happening. The company's Christiansfeld Dairy Centre in central Denmark is using a combination of Wonderware plant intelligence products to achieve these product-quality goals.

The Christiansfeld dairy supplies fresh milk products to 850 stores and more than one-million people on the Jutland Peninsula. Arla Foods prides itself on delivering the freshest milk products on the market. In fact, Arla Foods' Express brand milk goes from the cow to the grocery story shelf within 12 hours.

To meet this demanding schedule without compromising quality, Arla Foods' dairies must be as efficient as possible, which is why the Christiansfeld dairy selected a Wonderware plant intelligence solution. The new system provides visibility into plant-floor processes and traces product geneaology.

According to Erik Vesløv, production manager of Arla Foods' Christiansfeld plant, the company has adopted a competitive strategy based on the high quality of its products, making quality control and traceability critical.

"We produce the freshest possible milk — the Arla Express — which follows a 12-hour delivery concept," Vesløv said. "We also make a variety of other products, including organic milk, skim milk, chocolate milk and cultured products. An efficient manufacturing cycle is key to our goal of delivering quality products."

Wonderware solutions were first employed at Christiansfeld in 1998 when the dairy installed a new separation and pasteurization line to produce organic milk. Wonderware's Invensys sister company, APV, was called in to provide a turnkey solution that included hardware, PLCs and Wonderware's InTouch human-machine interface (HMI) software for supervisory control.

A few years later, in 2002, the dairy was refurbished and upgraded. The Pascon control system that had been in use for the past 25 years was replaced with a plant intelligence system that would provide full integration, traceability and visibility into actionable plant data. After a rigorous selection process, Arla Foods selected the Wonderware plant intelligence solution, which includes the IndustrialSQL Server historian, InTrack resource tracking software, DT Analyst asset monitoring and OEE (overall equipment effectiveness) software, and the InTouch HMI. This solution provides increased insight into the dairy's production processes and improves traceability.

An operator at the Christiansfeld plant views data related to the dairy's separation and pasteurization line.

Arla Foods installed Wonderware's InTrack resource tracking software to handle its continuous manufacturing process. The software provides reports on the cleaning and filling processes; the various temperatures in the filling process; and the flows in the cleaning process. This level of data collection and analysis enables Arla Foods to maintain its reputation as a leading provider of the freshest dairy products.

The Milk Process

Every evening, raw milk is delivered from the farms to the dairy and milk processing begins. At each stage of the process, critical information — such as pasteurization temperatures and flow data from the cleaning process — must be tracked and recorded. Automating data collection has significantly increased the amount of control managers have over the day-to-day operation of the dairy.

"The previous dairy systems were not automated," Vesløv said. "The PLCs were not connected, there was no reporting, and there was no traceability. It was also possible to overfill a tank, leading to unnecessary waste. And, because the process was highly manual, it was time-consuming and inefficient.

"Previously, in order to access vital process information, we had to wade through piles of reports. But the new system automates everything, and we can now provide critical process information to the people who need it to make important business decisions."

The IndustrialSQL Server historian is the backbone of this system. Based on Microsoft's SQL Server technology, the software collects data from industrial and business systems throughout the plant — right down to the individual PLCs on the plant floor — and provides a single centralized data resource for production, process and material history.

The data can be accessed in real time by the Wonderware system, which provides data visualization and control via the InTouch HMI and detailed product genealogy from the InTrack software. Next, DT Analyst software identifies and fixes problems in the production process and distributes the important and useful information to the appropriate personnel.

"Traceability is mandatory and has been for many years. But, when you use a paper-based system, it takes a lot of time, slowing response time," Vesløv said. "With the previous system, it would take hours to locate the appropriate data to resolve a customer complaint. Wonderware's plant intelligence system has enabled Arla Foods to enhance its reporting capabilities to more quickly address customer complaints. We are now able to access reports more quickly, which allows us to identify any errors in the manufacturing process that necessitate a product recall.

"In addition to faster response times, this new level of traceability actually reduces the risk of having to recall a large amount of product because we have detailed information on each batch. All we need is a package number to know exactly what time a given product was produced and what ingredients were used to make the product. We can then create a report and see exactly what was going on at that time and then implement a limited recall if necessary."

A Prosperous Merger

The result of a merger between the Danish MD Foods company and the Swedish Arla dairy in the spring of 2000, Arla Foods is Europe's largest dairy company and receives 7.1 billion kilograms of milk per year. The Arla Foods co-operative is owned by approximately 13,700 milk producers in Denmark and Sweden. The Danish co-operative owners supply 4.0 billion kilograms of milk to Arla Foods every year, which equates approximately 90% of all milk production in Denmark. The Swedish owners supply 2.2 billion kilograms, which is equivalent to approximately 60% of Sweden's milk production. In addition, Arla Foods purchases 0.9 billion kilograms of milk in the UK.

These milk products are divided into three divisions: liquid milk — which accounts for 40% of the overall turnover — cheese and powder.

Wonderware's QI Analyst statistical process and quality control (SPC/SQC) software is the corporate standard for Arla Foods' cheese division.

Milk cartons move along a conveyor at the Christiansfeld, Denmark plant of Arla Foods.

The "One Arla" Strategy

One of the drivers behind the adoption of an effective plant intelligence system was a directive from Arla Foods' corporate headquarters, which wanted better visibility into the performance of all its diverse plants. This strategy is called "One Arla."

"The 'One Arla' approach started two years ago," said Jørgen Greve, Christiansfeld Dairy Centre plant manager. "The goal is to provide all our plants with the same process. The program calls for all of the systems within the Arla Foods organization to be integrated into a single system. This will make it easier for our corporate headquarters to follow up on business operations on a regular basis — be that daily, weekly or monthly. 'One Arla' requires us to report efficiency, quality and performance data and key performance indicators in a uniform way."

Implementing the Wonderware plant intelligence solution has also helped Arla Foods improve its ability to follow up on quality issues. The company now has documentation for the cleaning and filling processes as well as a variety of temperatures, enhancing the dairy's ability to monitor the manufacturing process and ensure high product quality. In addition, Arla Foods now benefits from an unprecedented level of transparency between the various processes, giving the company a comprehensive overview of production and the ability to significantly reduce errors.

Building on these successes, the Christiansfeld plant next took control of its equipment efficiency with DT Analyst asset monitoring and OEE software, which began producing useful data only days after installation. This out-of-the-box reporting system delivers a simple OEE solution that helps Arla Foods' personnel drive machine efficiency improvements on the plant floor and then report their accomplishments throughout the organization, all the way up to corporate headquarters.

"Using DT Analyst software and the OEE concept, we expect to improve competitiveness and machinery utilization," Vesløv said. "We'll use it for continuous efficiency improvements such as increased uptime, reduced downtime and more employee involvement. To achieve this, we need more consistent data collection, which will be provided by the Wonderware plant intelligence system."

The "One Arla" strategy has enabled Arla Foods to consistently measure OEE and benchmark the progress of its 70 sites, all the way up to the ERP level. As a result, Arla Foods' managers can make strategic decisions based on what each plant can accomplish.

The Ingredients of Success

Success in the turbulent and highly competitive consumer market is dependant upon meeting stringent quality demands in the most efficient way possible.

"Arla Foods is experiencing great pressure from the market," Greve said. "We have bigger and bigger consumer chains, which are pressuring us on prices. And, of course, we have to respond to that pressure and be more efficient on the line to reduce production expenses as well as maintain our margins and remain profitable.

"We have to get each and every hour out of each and every machine. This has made plant intelligence a critical part of our strategy. We need to improve all the production process times to remain competitive. It's also critical that we know what's happening on the plant floor so that we can make the best possible decisions.

"The past year has proven that the Wonderware system is critical to our ability to effectively respond to market pressures. It gives us the information we need when we need it. In essence, it supports our vision of the future," Greve concluded.

With Wonderware's comprehensive plant intelligence solution, Arla Foods can continue to fulfill its promise of delivering the freshest milk products from the grocery store to the tables of Europe.

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