



## Fast and flexible information system provides new possibilities for development

Speed, high capacity, easy-to-use applications and excellent possibilities for developing new ways to take advantage of the extensive amount of stored process data. Just some of the benefits offered by the new datawarehouse system introduced at Forsmark nuclear power plant. The system has been supplied by PlantVision and adapted to the nuclear power industry and Forsmark's specific needs through close cooperation with Forsmark employees.

As one would expect, there are stringent requirements for supervision and documentation of processes at Sweden's nuclear power plants. The Forsmark power group has, since its inception, stored large amounts of process information in a database.

"We have always used systems developed internally, but they no longer fulfill our needs, neither with respect to storage capacity, nor the methods for extracting, analyzing or presenting data," explains Torbjörn Wikman, Project Leader within the Forsmark power group.

Forsmark's first reactor started in 1980, with storage of process data beginning at the same time. Since then,

more and more components have been connected via computer and application areas have multiplied. Finally, the systems became completely overloaded.

### Windows-based solutions

PlantVision won the assignment to implement a new solution at Forsmark nuclear power plant, ahead of more than ten other tenders. PlantVision's solution is based on standard software that can be specially adapted to meet different requirements. All applications are Windows based. "We have gained a very user-friendly system, which is also both flexible and expandable," states a satisfied Torbjörn Wikman.

Around 500-600 people at Forsmark nuclear power plant make use of the system. It has been introduced without requiring extensive training due to the fact that it is Windows based. Application areas are many, for example: process supervision; process optimization; status analysis; statistical and regulatory reporting; and analysis of irregularities etc.

### Increased accessibility

The system's basic function is to collect and store ope-

rational data from different sources, such as the process computers at the various nuclear power blocks. For security reasons, these are protected by several firewalls, while the number of users who need access is small. Previously, certain data could only be extracted from the process computers from within the control room. It was then transferred to paper and then manually entered into the process databases.

In the new system, data is exported continuously from the process computers to a common database for all blocks outside of the firewalls. In this way, data can be made available to considerably more people than previously, without any risk to security. "This means that during operation, and in real-time, we are able to carry out analyses as well as comparisons between blocks without needing to go into the process computers," says Torbjörn Wikman.

## Tools for process optimization

The system has very high capacity for receiving data, which was a central requirement within the assignment. While incoming analog measurement values can only be stored with intervals of around 30-60 seconds, digital changes to measurement values can be stored in a millisecond.

"We have gained completely new possibilities for optimizing different processes," says Torbjörn Wikman. Among others, he names the possibility to optimize turbine efficiency. Where previously employees only had access to measurement values with intervals of an hour, there now exists the possibility to follow the values minute by minute – and, therefore, the possibility to make quick process adjustments.

## Status-based maintenance

Basic data, i.e. data from every single point of measurement, is stored in a historical database. Changes to measurement values are stored in a special events database. Thanks to tight data storage, if an irregularity occurs there is every possibility of being able to trace the reasons. This is a great asset, considering that public authorities place enormous demands on following up irregularities.

"By tracing backwards we can also see what indicators existed and, thereby, learn how to prevent problems," says Lennart Kloow, responsible for the system at Forsmark 1. In the future, both Lennart Kloow and Torbjörn Wikman believe that maintenance at Forsmark will, to a greater and greater extent, be based on status analysis. For example, running time or functional analysis, based on stored data. As a further example, Torbjörn Wikman explains that there are strict limits for how long it can take before a valve opens or closes. Stored data can

show if a valve is approaching that critical limit. "This means we can avoid troublesome measurements," adds Lennart Kloow.

## Regulatory reporting

According to Torbjörn Wikman, it has also become much easier to use and interpret the data. The new applications mean that almost all data can be presented graphically and not just in table format. Various data from the same point of measurement can be summarized and compared graphically.

"Previously, mean values were stored, which were not comparable," says Torbjörn Wikman. For this reason, Forsmark have not released their historical data. Now, these data have been converted and can be used in analyses covering longer-term averages, i.e. mean values for months or years. The regulatory reports that Forsmark deliver are usually based on this sort of time frame. "Now that we can easily present all data graphically, it also means that our regulatory reports are easier to interpret," adds Torbjörn Wikman.

### About Forsmark

The Forsmark nuclear power plant lies on Sweden's Baltic coast, north-east of Uppsala. Here, electricity is produced in three boiling water reactors, which started operation in 1980, 1981 and 1985, respectively. Forsmark is Sweden's newest nuclear power plant. Annual production is approximately 25 TWh, equating to about one sixth of Sweden's entire electricity production. Revenue for the Forsmark power group is around four billion Swedish crowns per annum and employees number circa 850. Vattenfall is the largest stakeholder, owning 66%. The other owners are Mellansvensk Kraftgrupp (25.5%) and E.ON Sverige (8.5%).

### About PlantVision

PlantVision is a leading supplier of services and software products for information management and operational decision support to the process and manufacturing industry, as well as laboratories. Through extensive practical experience from the manufacturing industry, the company is able to offer services and products that help customers gain better control over their production processes and, thereby, increase their efficiency and profitability. PlantVision's customers are mainly within areas such as pharmaceuticals, pulp and paper, chemical and petrochemical, metal and mineral, energy and food and beverage.