



Migration to Simatic PCS 7 and Simatic IT at INEOS Phenol with no downtime or loss of production

A Challenging Project

The partnership between INEOS Phenol in Gladbeck, Germany, and Siemens actually began with an order that had little to do with process automation: modernizing part of the low-voltage power distribution system and constructing a new central power supply station North at the Gladbeck site. Due to the success of this project, Siemens also won the contract for other challenging projects – for example, the modernization of the control technology for a continuous process with about 8,000 process signals. The result: clear benefits in the operation of the plant.

The old switchboards that supplied power to the distillation section had been in service for a good 50 years and were no longer state of the art. “In addition, by building new switching stations, we were able to design a redundant energy supply to the drives and combine several old switching stations for simplified maintenance,” explains Oliver Sauer, the techni-

cian responsible for electrical planning and the supervision of the modernization of the switching stations at INEOS Phenol. Following intensive product analysis, INEOS Phenol chose a Sivacon-based switchboard with a modular switching unit design. “There really are no alternatives that offer a better procing for a plant the size of Gladbeck,” says Oliver Sauer.

Detailed analysis of the current status

INEOS Phenol wanted to retain the option of locally switching the drives because this switching is also used in visual inspections of the drives. In addition, it had to be possible to switch the drives from the control station. This is no problem with the Sivacon technology.

However, before the power distribution system could be converted, a detailed stock-taking was necessary. This was carried out by the Siemens subsidiary FEAG, now a joint venture of the Interschalt company and Siemens, under contract with Siemens. All existing consumers and load feeders were exactly localized with the aid of the documentation tool e-plan 21, mapped, and named according to the appropriate standard. With this documentation, all important information about a drive is contained in one drawing, which is particularly important for maintaining continuous operation and clearing faults. In addition, the interface to the control station was also configured to guarantee the smooth integration of the low-voltage distribution system with

INEOS Phenol

INEOS Phenol, one of the members of the INEOS Group, recently acquired Innovene, and is now the third largest chemical company in the world.

INEOS Phenol is also one of the largest sales contributors within INEOS. Currently, about a quarter of the phenols required worldwide for products such as polycarbonates (DVDs, CDs), epoxy resins, and nylons come from INEOS Phenol production plants.

In addition to the Gladbeck site, which is the largest with an annual production of 650,000 tons of phenols, the company also has operations in Antwerp, Belgium, and Mobile, Alabama. Gladbeck is not only the largest INEOS Phenol site, but also the world's largest phenol plant.

INEOS will continue to invest in expanding its production plants over the next few years. In Wilhelmshaven, Germany, for example, several major projects are planned.

the process automation system. The Sivacon system consists of a total of 80 cabinets supplying 300 motors and drives. The switchgear is largely standardized and contains undervoltage relays as required, remote on and off functions, and all circuits needed for the local operation of the consumers.

Thanks to meticulous preparation, it was possible to upgrade the switchgear without interrupting production. The new power supply station, with a new distribu-

tor and feed, was built first, before some 250 kilometers of new cable were laid. Since cable crossings were to be avoided, the cable routes had to be planned very carefully – a job greatly simplified through the advance documentation.

The Gladbeck site is now equipped with a modern, efficient power distribution system. The entire conversion was achieved without any significant faults or production losses, and INEOS Phenol is completely satisfied with the result.

Continued cooperation on automation

The excellent results of the power supply project were an ideal recommendation for the next project: the modernization of the distributed control system. The existing control system from the eighties was outdated, and problems with obtaining spare parts were already emerging. Within the scope of this modernization, INEOS Phenol wanted to combine the separate control stations for the two large process areas of distillation and oxidation into a single new station.

In addition to the positive experience with Siemens in the switching station pro-

“Such a project would have been inconceivable without sound, detailed, and logical advance planning.”

Ulrich Dallmeier,
head of EMR at INEOS Phenol Gladbeck

ject, the competitive price of the PCS 7 solution, the thorough documentation in German, and the impressive technical features of the system (such as the tight integration of the safety technology and the extensive functions for effective alarm management), the sophisticated migration strategy from the old process control system to Simatic PCS 7 was ultimately a very decisive factor in the company's decision, says Ulrich Dallmeier, head of the control and monitoring technology department at INEOS Phenol. “Before the project even began, Siemens was able to show us a solution that would enable us to change over to the new process control system without interruptions in production.”

Siemens was responsible for all of the system engineering. The first project step involved the modernization of the distillation control technology. Six months were allotted to change over to the new system. Thanks to the excellent planning of the team and to the information about the requirements and specifications of the Gladbeck plants provided by the documentation for the power-supply station project, the conversion time was reduced to just four months – without a single break in production.

To minimize the risks associated with the conversion, the project was divided into three steps. The plant sections that were not currently in use were converted first. The planned migration strategy could thus be tested rigorously without risk. Then, the so-called non-critical plant sections were converted, and finally the crucial plant sections were changed over.

“Such a project would have been inconceivable without sound, detailed, and logical advance planning,” stresses Ulrich Dallmeier. “The project team, composed of ▶



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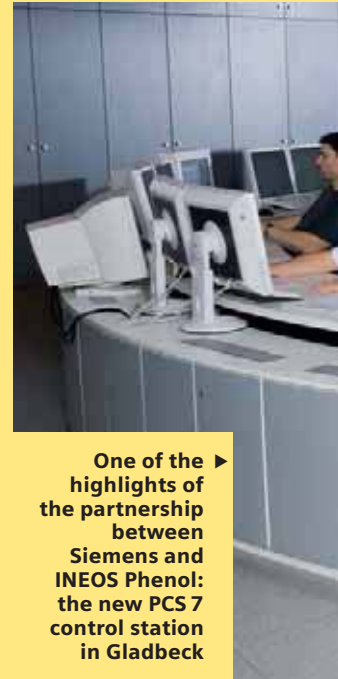


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“There really are no less-expensive alternatives for a plant the size of the one in Gladbeck.”

Oliver Sauer,
the technician responsible
for electrical planning
at INEOS Phenol Gladbeck

Chemical Industry



◀ The new switching system at INEOS Phenol was the first of the Siemens projects at the Gladbeck site

▶ One of the highlights of the partnership between Siemens and INEOS Phenol: the new PCS 7 control station in Gladbeck

Conversion of the old control system configuration using Access: The migration tool creates lists that support the changeover procedure and inspection. The tool is continually being improved, and several other migration projects are in progress at present that can be performed with the aid of the tool

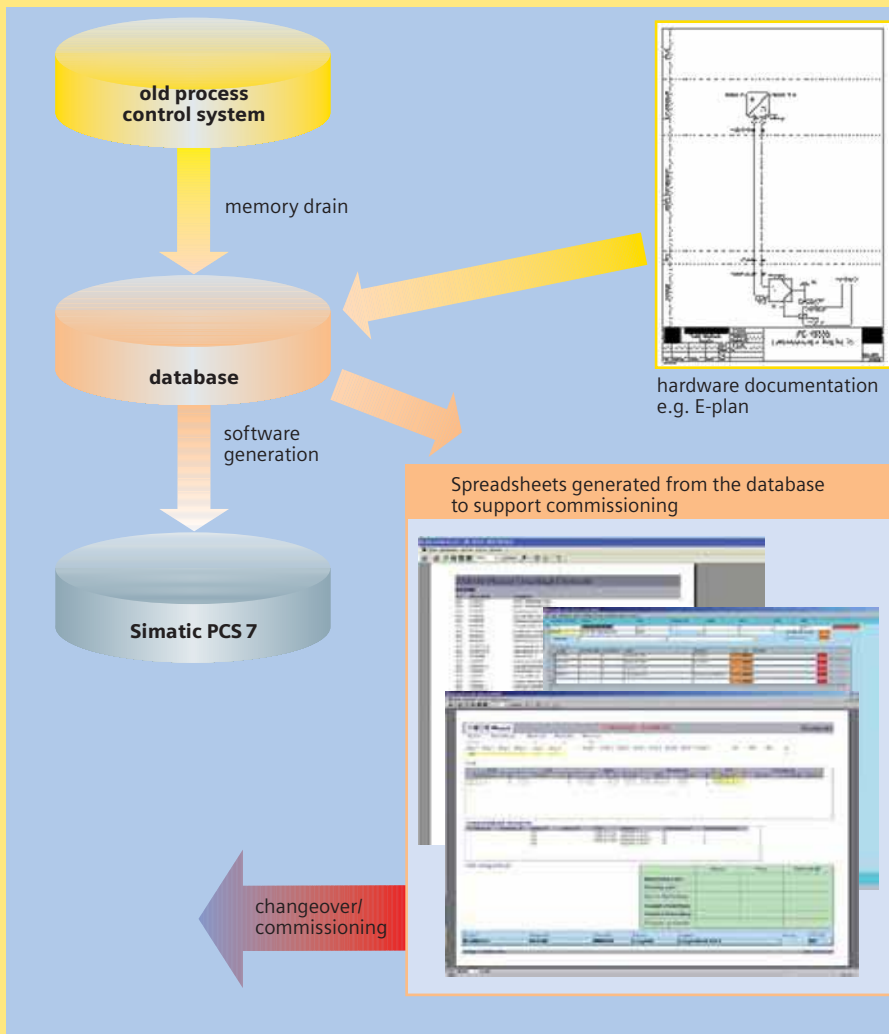
▶ staff from Siemens and us, planned the conversion from start to finish and precisely documented all necessary steps.”

“The gradual changeover was also advantageous in terms of the training and instruction of the personnel,” says Ulrich Dallmeier. “The personnel was able to be trained slowly and step by step, making the changeover much safer overall.” Thanks to the user-friendly operator faceplates, the employees quickly accepted the new system.

The new control system consists of a total of eight PCS 7 switch cabinets with one highly available AS 400H automation system each. In addition to the actual process plants, analyzers, a laboratory information system, and a process data archive based on MIS Light are integrated into the PCS 7 system.

PCS 7 also offered clear advantages in terms of the system configuration and control of the processes. For example, the alarm volume was checked and improved during the course of the upgrade. “This has put us in the region of one alarm every 10 minutes, as recommended by NAMUR regulation NA 102,” says Ulrich Dallmeier.

Process optimizations and improvements are very important in every production plant. In order to be able to analyze irregular production conditions professionally with modern, computer-aided systems, INEOS Phenol recently decided to implement the Simatic IT manufacturing execution system. This provides the approximately 60 users in the chemical factory with a modern MES platform through the office network.





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Improved performance without additional plants

Additionally, the approximately 30-year-old compressors, also integrated into PCS 7, were overhauled and optimized during the course of the modernization, allowing the capacity to be increased by more than five percent without the need for another compressor.

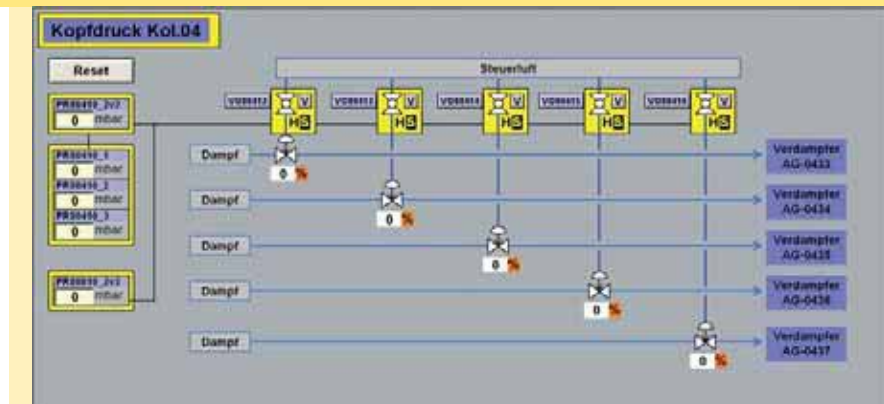
The process control itself was also optimized at the same time. A Siemens team supported INEOS Phenol in the development of an advanced process control solution. The aim was to calculate – with the aid of a multiple-variable controller on an external PC – the disturbance variables acting on the controlled system, and ideally to eliminate their influence.

An optimistic view of the future

After completion of the first of the two project phases, the switching technology



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Siemens AG

With Simatic PCS 7, the operators also have an optimal view of the safety functions – they are highlighted in yellow on the process screens

Eight barriers for greater safety: The INEOS Phenol safety concept

With its multistage safety concept, INEOS effectively prevents faults and provides maximum protection for the plants, the employees, and the public.

- ▶ **containment of hazardous substances**
- ▶ **operator alarms**
- ▶ **supervisor alarms**
- ▶ **electronic safety devices**
- ▶ **mechanical safety devices**
- ▶ **buffer zones and stationary firefighting equipment**
- ▶ **internal emergency management**
- ▶ **external emergency management**

The new PCS 7 system was designed to support maximum process safety at the Gladbeck facility. Extensive safety functions ensure that personnel can operate the process in a safe state in the case of an alarm. The safety functions are highlighted on the flow screens, making the safety equipment easy for the operator to identify.

upgrade and the modernization of the control system in the distillation area, INEOS Phenol sees the results of the joint project with Siemens very positively. “We do not

expect everything to work perfectly the first time in such a large project,” says operations manager Dr. Reinhard Sigg, “but the critical issue is how a project partner reacts when there are problems. Siemens was extremely cooperative and dealt with issues rapidly and efficiently.” As a result, both parties are very optimistic about the next project step: the transition of the control technology in the oxidation unit to the PCS 7 system this year. ■

“The critical issue is how a partner reacts when there are problems.”

Dr. Reinhard Sigg, operations manager, INEOS Phenol Gladbeck

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