Application Story

Industry: Water
Products: Control Systems

Haltern drinking water plant

Reference project
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MITSUBISHI ELECTRIC Group
ME-Automation Projects GmbH
Description
The utility company Gelsenwasser AG supplies water, gas, heat and power to some three million people as well as the trading estates and industrial areas in the Ruhr and Münsterland regions, the Lower Rhine, East Westphalia, and the neighbouring regions in Lower Saxony. Hereby, the main activity involves the supply of drinking water for 46 towns and villages, with a total annual demand of about 290 million m³.

The Haltern plant – one of the largest in Europe – supplies drinking water for roughly one million people as well as businesses and industry in 20 towns of the northern Ruhr area, the Münsterland, and the city of Duisburg. Covering an area of 307 hectares, the Haltern reservoir has a capacity of some 20.5 million m³ of water supplied by the Stever and Mühlenbach rivers. Every year, about 110 million m³ of drinking water are procured, treated, and distributed.

In 1997, ME-Automation Projects – named Philips Automation Projects at that time – was contracted to provide the entire automation system for the Haltern drinking water plant, with the aim of:
- Decentralizing the existing automation technology, and expanding it to cover the overall process
- Increasing the availability of the entire plant
- Ensuring the simple integration of future expansions.

The existing automation technology for water treatment – consisting of five S5 automation systems, the low-voltage switchgear, and the telecontrol system with SINAUT equipment – was completely integrated into the new overall process management concept. Similarly, the contract included modernization of a large part of the existing telecontrol network. Moreover, 27 new Philips automation systems were installed and commissioned for the water procurement operations. The telecontrol equipment in 14 existing stations for water distribution was replaced with modern technology, and standardized in accordance with the overall automation concept. To ensure utmost availability, equipment in the master telecontrol station for water distribution was installed redundantly. The existing automation technology was replaced with compact modules in modern automation stations, which are located in the drinking water plant’s decentralized substations. A dual-ring FDDI glass-fiber network with a transmission capacity of up to 200 Mbits/s was used to link the entire process automation system. Also the FDDI network is redundant. All process data from the plant sections Procurement, Treatment, Pumping, and Distribution are transmitted to the central control room. Hereby, four PMSX® operating stations provide access to some 12 000 process variables. In case of changes or plant expansions, the entire process management and automation system can be configured and programmed conveniently via a central engineering station.

Process data are always stored decentrally in the PMSX® process servers, which greatly increases data security and availability. In addition, important measurement values are exported to a central Oracle database for further use by the customer. A central PMSX® server cyclically transfers these values to the database.

Modern switch technology is used to connect the automation system to the office network and the networked printers.

Modernization of the entire plant was carried out in several stages during normal operation and with minimum downtimes to ensure an uninterrupted water supply without adverse effects on quality. This was only possible by means of detailed planning and strict adherence to the agreed time schedule. Thanks to close cooperation between customer and ME-Automation Projects, formerly known as KH-Automation Projects, the complex project was even completed ahead of the planned date. Moreover, with the aim of maintaining the plant’s high technical level, it was upgraded several times in the following years. This was achieved by retrofitting and process optimization in discrete steps. Apart from the remote links to other drinking water plants, the entire data network was converted to an Ethernet ring using switch technology. During renewal of the 5 kV medium-voltage equipment, the old Philips automation stations were replaced with the Mitsubishi System Q. In addition, four new operating stations were installed. In another conversion phase, the existing PMSX® process management system was migrated to the newer PMSX® pro without interrupting operation.
Technical requirements

- Central process management of the plant
- Redundant operating and monitoring stations
- Redundant fieldbus using optic fiber technology
- Integration of remote substations into the overall system
- Integration of the telecontrol system
- System-wide engineering from a central engineering workplace
- Communications link to a plant reporting system using an Oracle database
- Archiving of all incoming alarms & messages
- Archiving of all relevant measurement values in appropriate compression stages
- Strict data consistency
- Standardized software tools
- Ensuring the simple integration of future expansions
- Interface to the company-wide office network

Scope of delivery

- Process management system PMSX® pro
- Automation equipment
- Network technology
- Conversion of low and medium-voltage switchgear
- Installation & wiring
- Target specifications / engineering
- Programming
- Commissioning / trial operation
- Personnel training
- Documentation

Process management characteristics

- Process management system PMSX® pro
- Topology distributed system
- Network optic fiber Ethernet TCP/IP
- Automation system Philips P8, Siemens 55/57, Mitsubishi System Q
- Telecontrol stations 28 SINAUT
- Data points about 14,000
- Automation stations 68
- Operating stations 10
- Process servers 47
- Large-screen video cubes 2
Excerpt from our reference list

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