Application Story

Industry: Water
Products: Control Systems

Main sewage plant
Stuttgart-Mühlhausen

Reference project
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Stuttgart’s municipal sewage treatment authority “Stadtentwässerung” (SES) operates a sewer system with a total length of some 1745 km, plus 68 stormwater overflow basins, 47 stormwater storage basins, 53 sewage pumping stations, and four modern sewage treatment plants in Mühlhausen, Möhringen, Plieningen and Ditzingen. The main treatment plant in Stuttgart-Mühlhausen has a design capacity of 1.2 million population equivalents, and processes about 220,000 cubic meters of wastewater every day. The wastewater enters the treatment plant via two trunk sewers, each of which is fitted with screens and sand trap to provide mechanical pre-treatment. The actual sewage treatment is carried out in several stages: mechanical, biological, and final treatment.

The primary sedimentation basins serve for the mechanical treatment. Hereby, sludge and solids settle at the bottom of the basins, from there they are pumped to the digesters. The digested sludge is dewatered mechanically in centrifuges, and then dried before being incinerated in fluidized bed furnaces. From the sedimentation basins, the wastewater enters the activated sludge tanks, where it is cleaned by microorganisms. Subsequently, the wastewater passes through the secondary settling tanks. Here, the microorganisms settle at the bottom of the tanks as sludge, which is pumped back to the activated sludge tanks.

Finally, the wastewater reaches the third treatment stage – the sand filter beds. Here, the remaining suspended matter is removed, before the clean water is discharged into the Neckar river. With the aim of maintaining sewage treatment operations at a high level, and keeping up with technical developments, the plant was retrofitted and upgraded in several stages during the years. In the early 1990’s, ME-Automation Projects (called Philips Automation Projects at that time) supplied the process control & automation equipment. In those years, the PMS 68000 process management system with its distributed architecture fulfilled all the requirements for overall plant control reliably.

As part of a subsequent conversion measure, the automation & process control equipment was revamped in several separate stages to obtain modern and future-proof systems. Stuttgart’s municipal SES authority placed an order with ME-Automation Projects, formerly known as KH-Automation Projects, to upgrade the existing equipment using the powerful PMSX® pro process management system.

Consequently, the PMSX® pro system was installed during every new construction phase, whereby an intelligent migration concept was used to replace the outdated PMS 68000 system in steps. This concept enabled previous investments to be preserved, expansions had no retroactive effects, and the work was carried out without interrupting normal operation.

Similarly, due to the complex structure of the main sewage plant with subsequent sludge incineration, a distributed automation & control system was essential. This permitted a clearly structured and hierarchical topology with 37 operating stations to be implemented. The required high levels of availability and reliability were achieved by means of redundant data storage and by distributing the process control tasks among 43 process servers.
Technical requirements

Process management and sequence control of entire plant from a central location

Operation and monitoring of entire plant from all distributed operator stations

Stepwise migration from the existing control & automation system to PMSX® pro

Vertical and horizontal data consistency

Consistent data coupling with existing control & automation system

Conversion and expansion during normal operation without retroactive effects

System-wide engineering from a central engineering workplace

Long-term storage of data and messages

Archiving of all relevant measurement values in appropriate compression stages

Strict data consistency in all software tools

Availability of all process values for further processing

Standardized software tools in accordance with IEC 61131-3

Scope of delivery

- Process management system PMSX® pro
- Automation equipment
- Network using switch technology
- Target specifications / engineering
- Programming according to IEC 61131-3
- Documentation
- Factory test
- Installation / commissioning / trial operation
- Personnel training

Process management characteristics

- Process management system PMSX® pro
- Topology
- Network
- Automation system
- Data points
- Automation stations
- Operating stations
- Process servers

- distributed system
- optic fiber
- Ethernet TCP/IP
- Mitsubishi System Q
- about 60 000
- 73
- 38
- 45
Excerpt from our reference list

www.me-ap.de

GERMANY
ME-Automation Projects GmbH
Kasseler Straße 62
34277 Fuldabrück
phone +49 (0)561 58540
fax +49 (0)561 5854530
e-mail: info@me-ap.de
www.me-ap.de

NETHERLANDS
ME-Automation Projects
Science Park Eindhoven 5008 A
5692 EA Son
phone +31 (0)40 26 79 900
fax +31 (0)40 26 79 919
e-mail: secretariaat@me-ap.eu
www.me-ap.eu