

Application Story

Industry: **Water**

Products: **Control Systems**

Main sewage plant Stuttgart-Mühlhausen



Reference project
Main sewage plant
Stuttgart-Mühlhausen

 **MITSUBISHI ELECTRIC Group**
ME-Automation Projects GmbH

Project of ME-Automation Projects GmbH, a member of the Mitsubishi Electric Group. First published in June 2014.

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Reference project
Main sewage plant
Stuttgart-Mühlhausen

Customer:	Stadtentwässerung Stuttgart (SES)
Plant:	Main sewage plant Stuttgart-Mühlhausen
Population equivalents:	1.2 million
Project value:	~ 15.0 million Euro
Project duration:	1996–present (in discrete construction stages)

Description

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

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|-----------------------------|--------------------------------|
| ▮ Process management system | PMSX [®] pro |
| ▮ Topology | distributed system |
| ▮ Network | optic fiber
Ethernet TCP/IP |
| ▮ Automation system | Mitsubishi System Q |
| ▮ Data points | about 60 000 |
| ▮ Automation stations | 73 |
| ▮ Operating stations | 38 |
| ▮ Process servers | 45 |

Excerpt from our reference list

				
Waste incineration plant Frankfurt	Waste incineration plant Iserlohn	Waste incineration plant Weißenhorn	Wastewater treatment plant Erdinger Moos	Wastewater treatment plant Bad Homburg Ober-Eschbach
				
Milk production Regensburg	Energy supply center Dresden	Energy supply center Oberhausen	Pellet production plant Offenbach	Biomass CHP plant Wiesbaden
				
Energy supply center Munich Airport	Waste incineration plant Frankfurt	Drinking water plant Haltern	Sewage network and wastewater treatment plant Hamburg	Pellet production plant Dotternhausen
				
Wastewater treatment plant Düsseldorf-Nord	Waste incineration plant Frankfurt	Waste incineration plant Hamm	Waste incineration plant Frankfurt	Facility Management Control System Dresden
				
Facility Management Control System Nijmegen	Tank terminals Rotterdam	Barthel Pauls Söhne AG Biomass CHP plant	Wastewater treatment plant Stuttgart-Mühlhausen	Wastewater treatment plant Nuremberg
				
Wastewater treatment plant Nidderau	Wastewater treatment plant Landshut	Drinking water plant Friesland		
				
Tank terminal Botlek	Sewage network Wuppertal			

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